

FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

Manufacturer or Supplier:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Product:	LTE Module
Brand Name:	Quectel
Model Name:	SC66-A
FCC ID:	XMR201908SC66A
Date of tests:	May. 23, 2019 ~ Sep. 07, 2019

The tests have been carried out according to the requirements of the following standard:

- ☒ **FCC Part 15, Subpart C, Section 15.247**
- ☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Sep. 12, 2019	 Date: Sep. 12, 2019

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1 SUMMARY OF TEST RESULTS.....	5
1.1 MEASUREMENT UNCERTAINTY	5
2 GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF TEST MODES	8
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST	9
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	9
2.3 DUTY CYCLE OF TEST SIGNAL	12
2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS	14
2.5 DESCRIPTION OF SUPPORT UNITS	14
2.6 ANTENNA REQUIREMENT	15
CONCLUSION:.....	15
3 TEST TYPES AND RESULTS.....	16
3.1 CONDUCTED EMISSION MEASUREMENT	16
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	16
3.1.2 TEST INSTRUMENTS.....	16
3.1.3 TEST PROCEDURES	17
3.1.4 DEVIATION FROM TEST STANDARD	17
3.1.5 TEST SETUP	18
3.1.6 EUT OPERATING CONDITIONS	18
3.1.7 TEST RESULTS	19
3.2 RADIATED EMISSION MEASUREMENT	21
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	21
3.2.2 TEST INSTRUMENTS.....	22
3.2.3 TEST PROCEDURES	23
3.2.4 DEVIATION FROM TEST STANDARD	23
3.2.5 TEST SETUP	24
3.2.6 EUT OPERATING CONDITIONS	25
3.2.7 TEST RESULTS	26
3.3 6 DB BANDWIDTH MEASUREMENT	50
3.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	50
3.3.2 TEST INSTRUMENTS.....	50
3.3.3 TEST PROCEDURE.....	50



3.3.4	DEVIATION FROM TEST STANDARD	50
3.3.5	TEST SETUP	51
3.3.6	EUT OPERATING CONDITIONS	51
3.3.7	TEST RESULTS	52
3.4	CONDUCTED OUTPUT POWER.....	58
3.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	58
3.4.2	TEST SETUP	58
3.4.3	TEST INSTRUMENTS.....	58
3.4.4	TEST PROCEDURES	58
3.4.5	DEVIATION FROM TEST STANDARD	58
3.4.6	EUT OPERATING CONDITIONS	58
3.4.7	TEST RESULTS	59
3.4.7.1	MAXIMUM PEAK OUTPUT POWER	59
3.5	POWER SPECTRAL DENSITY MEASUREMENT	61
3.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	61
3.5.2	TEST SETUP	61
3.5.3	TEST INSTRUMENTS.....	61
3.5.4	TEST PROCEDURE.....	61
3.5.5	DEVIATION FROM TEST STANDARD	61
3.5.6	EUT OPERATING CONDITION	61
3.5.7	TEST RESULTS	62
3.6	OUT OF BAND EMISSION MEASUREMENT	68
3.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT	68
3.6.2	TEST SETUP	68
3.6.3	TEST INSTRUMENTS.....	68
3.6.4	TEST PROCEDURE.....	68
3.6.5	DEVIATION FROM TEST STANDARD	69
3.6.6	EUT OPERATING CONDITION	69
3.6.7	TEST RESULTS	69
4	PHOTOGRAPHS OF THE TEST CONFIGURATION	82
5	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	83



Test Report No.: RF190522W005-7

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190522W005-7	Original release	Sep. 12, 2019



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
15.207	AC Power Conducted Emission	Compliance
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LTE Module
BRAND NAME	Quectel
MODEL NAME	SC66-A
NOMINAL VOLTAGE	DC 4V
MODULATION	DSSS, OFDM, GFSK
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n: up to 135 Mbps BT_LE: 1 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN :112.72mW (Maximum) BT-LE(4.0): 1.419mW (Maximum) BT-LE(5.0): 1.462mW (Maximum)
ANTENNA TYPE	PCB Antenna with 5.16Bi gain
HW VERSION	R1.0
SW VERSION	SC66ANAR01A06
I/O PORTS	Refer to user's manual

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a MIMO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
802.11b	2TX /2RX
802.11g	2TX /2RX
802.11n (20MHz)	2TX /2RX
802.11n (40MHz)	2TX /2RX
BT_LE	1TX /1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480



2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G**: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11n HT20	1 to 11	1	OFDM	6.5
BT-LE	0 to 39	19	GFSK	1&2

**RADIATED EMISSION TEST (ABOVE 1GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	6.5
802.11n HT40	3 to 9	3, 6, 9	OFDM	13.5
BT-LE	0 to 39	0, 19, 39	GFSK	1&2

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11n HT20	1 to 11	1	OFDM	6.5

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	CCK	1.0
802.11g	1 to 11	1, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 11	OFDM	6.5
802.11n HT40	3 to 9	3, 9	OFDM	13.5
BT-LE	0 to 39	0, 39	GFSK	1&2



ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	6.5
802.11n HT40	3 to 9	3, 6, 9	OFDM	13.5
BT-LE	0 to 39	0, 19, 39	GFSK	1&2

TEST CONDITION:

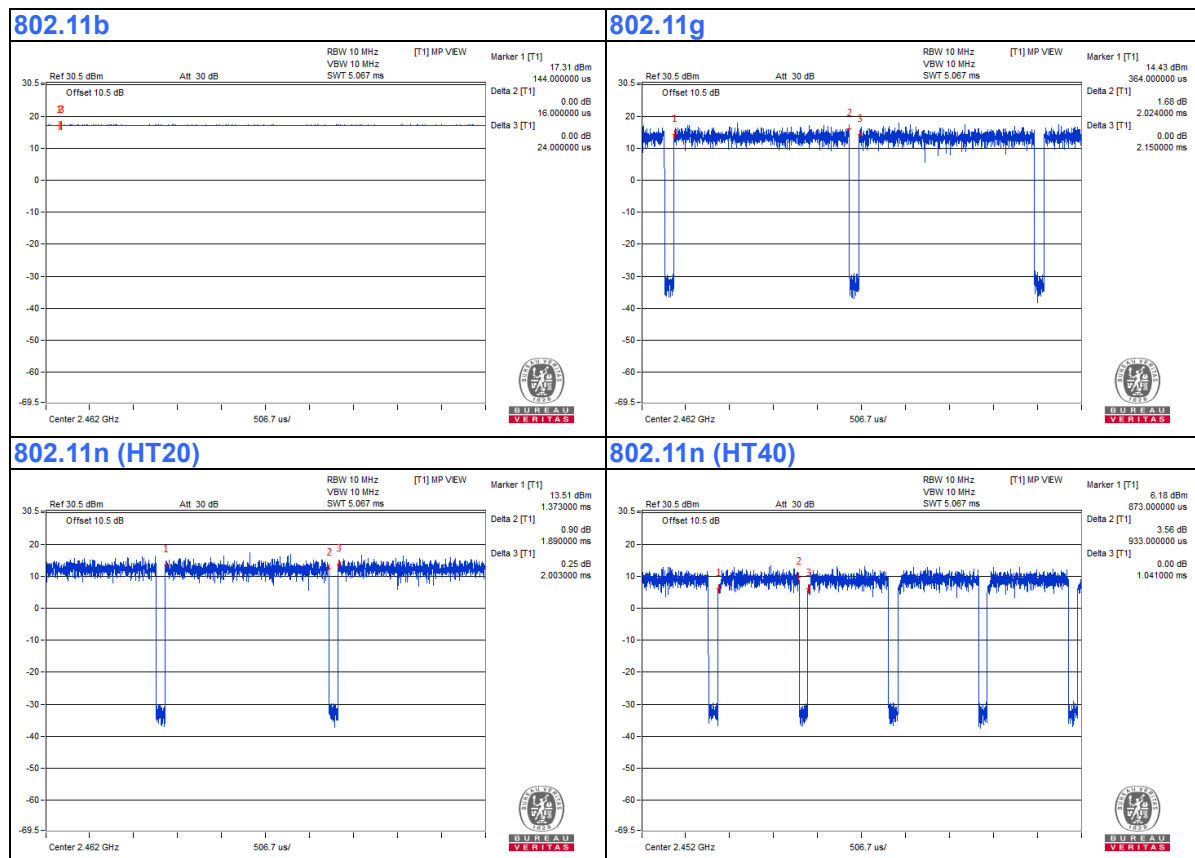
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	22deg. C, 54%RH	DC 4V	Star Le
RE≥1G	22deg. C, 54%RH	DC 4V	Star Le
PLC	24deg. C, 55%RH	DC 4V	Jacky Liu
APCM	25deg. C, 60%RH	DC 4V	Big Wang



802.11b: Duty cycle = 100%, Duty factor is not required.

802.11n (HT20): Duty cycle = $1.890/2.003 = 0.944 < 98\%$, Duty factor = $10 * \log(1/0.944) = 0.252$

802.11n (HT40): Duty cycle = $0.933/1.041 = 0.896 < 98\%$, Duty factor = $10 * \log(1/0.896) = 0.476$





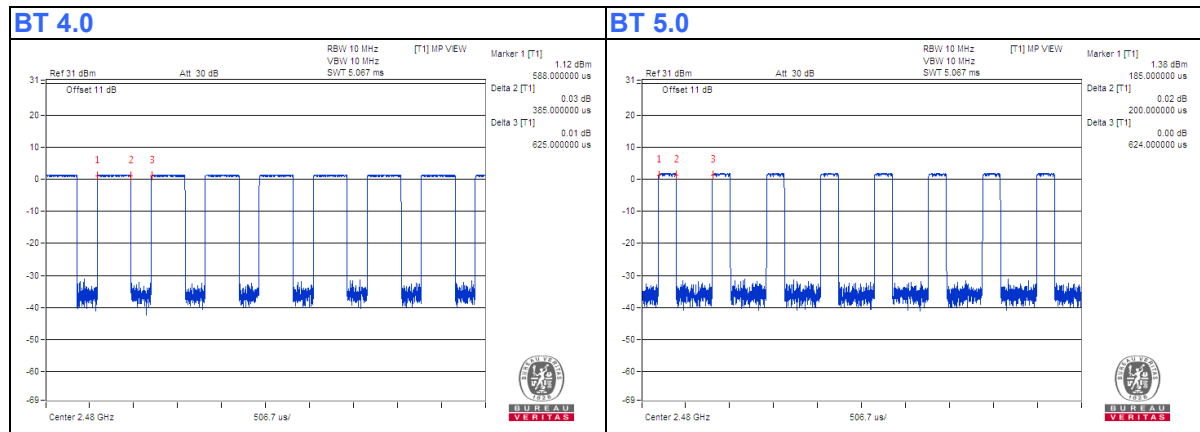
**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

BT LE

BT 4.0: Duty cycle = $0.385/0.625 = 0.616 < 98\%$, Duty factor = $10 * \log(1/0.616) = 2.104$

BT 5.0: Duty cycle = $0.200/0.624 = 0.321 < 98\%$, Duty factor = $10 * \log(1/0.321) = 4.942$



2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.247

558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

Note:

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m



2.6 ANTENNA REQUIREMENT

Per FCC Part 15.203. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Conclusion:

The EUT use one PCB Antenna that was permanently attached and the detail information list as below:

ANT Gain	Type	TX/RX	Frequency range
5.16	PCB Antenna	TX & RX	2400~2483.5GHz



3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 26,19	Feb. 25,20
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 26,19	Feb. 25,20

NOTE:

1. The test was performed in CE shielded room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



3.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

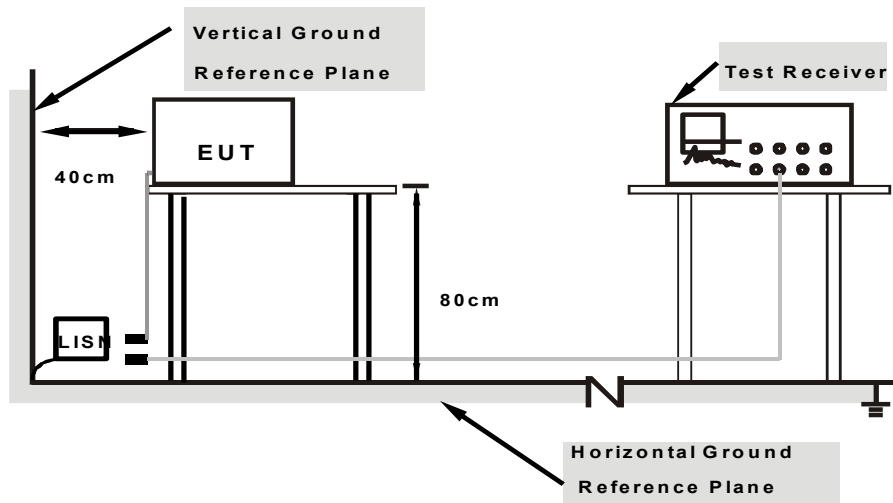
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.



3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.



3.1.7 TEST RESULTS

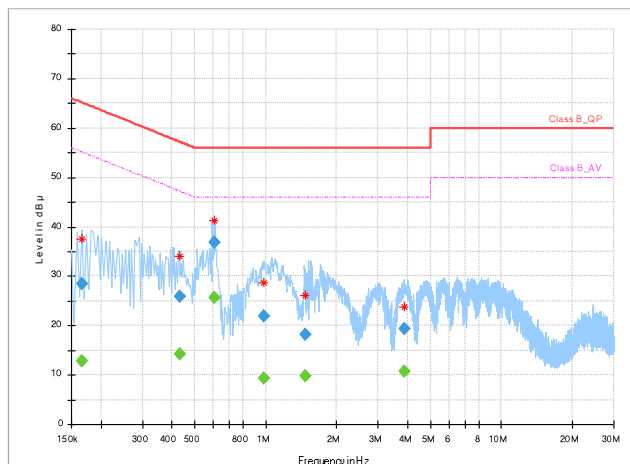
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25deg. C, 52RH
Test Voltage	DC 4V	Tested By	Jacky Liu

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	---	12.85	55.16	-42.31	L	ON	9.9
0.166000	28.41	---	65.16	-36.75	L	ON	9.9
0.432000	---	14.14	47.21	-33.08	L	ON	10.0
0.432000	25.89	---	57.21	-31.33	L	ON	10.0
0.608000	---	25.60	46.00	-20.40	L	ON	10.0
0.608000	36.91	---	56.00	-19.09	L	ON	10.0
0.980000	---	9.40	46.00	-36.60	L	ON	10.1
0.980000	21.92	---	56.00	34.08	L	ON	10.1
1.472000	---	9.76	46.00	-36.24	L	ON	10.1
1.472000	18.26	---	56.00	-37.74	L	ON	10.1
3.880000	---	10.68	46.00	-35.32	L	ON	10.2
3.880000	19.36	---	56.00	-36.64	L	ON	10.2

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





**BUREAU
VERITAS**

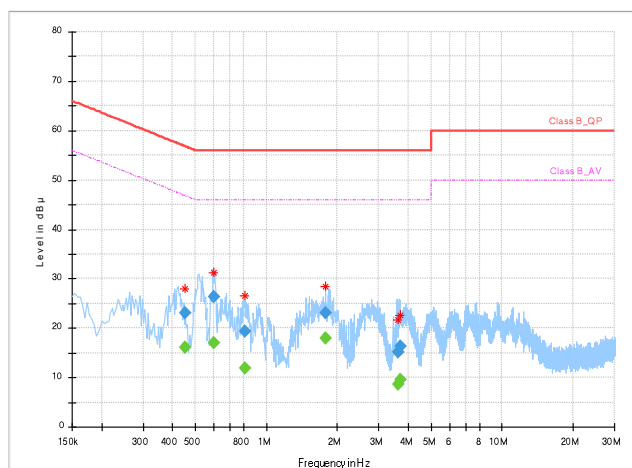
Test Report No.: RF190522W005-7

Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25deg. C, 52RH
Test Voltage	DC 4V	Tested By	Jacky Liu

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.452000	---	16.05	46.84	-30.79	N	ON	9.9
0.452000	23.17	---	56.84	-33.67	N	ON	9.9
0.600000	---	17.13	46.00	-28.87	N	ON	9.9
0.600000	26.31	---	56.00	-29.69	N	ON	9.9
0.812000	---	11.87	46.00	-34.13	N	ON	9.9
0.812000	19.33	---	56.00	-36.67	N	ON	9.9
1.784000	---	18.07	46.00	-27.93	N	ON	10.0
1.784000	23.19	---	56.00	-32.81	N	ON	10.0
3.624000	---	8.68	46.00	-37.32	N	ON	10.1
3.624000	15.13	---	56.00	-40.87	N	ON	10.1
3.700000	---	9.48	46.00	-36.52	N	ON	10.1
3.700000	16.44	---	56.00	-39.56	N	ON	10.1

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Feb. 26,19	Feb. 25,20
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
Horn Antenna	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 21, 18	Nov. 20, 19
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 24,19	Jun. 23,20
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25,20
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 24,19	Jun. 23,20
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jun. 24,19	Jun. 23,20

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.



3.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

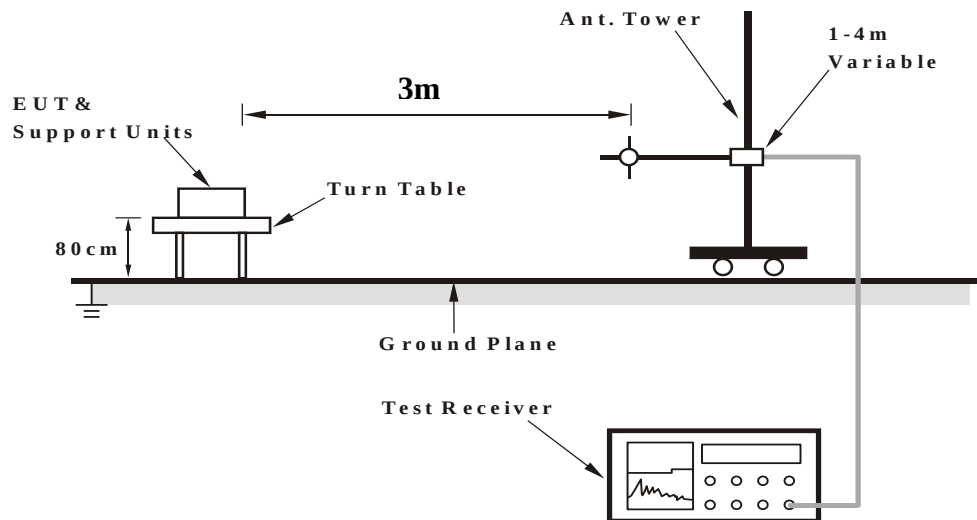
3.2.4 DEVIATION FROM TEST STANDARD

No deviation

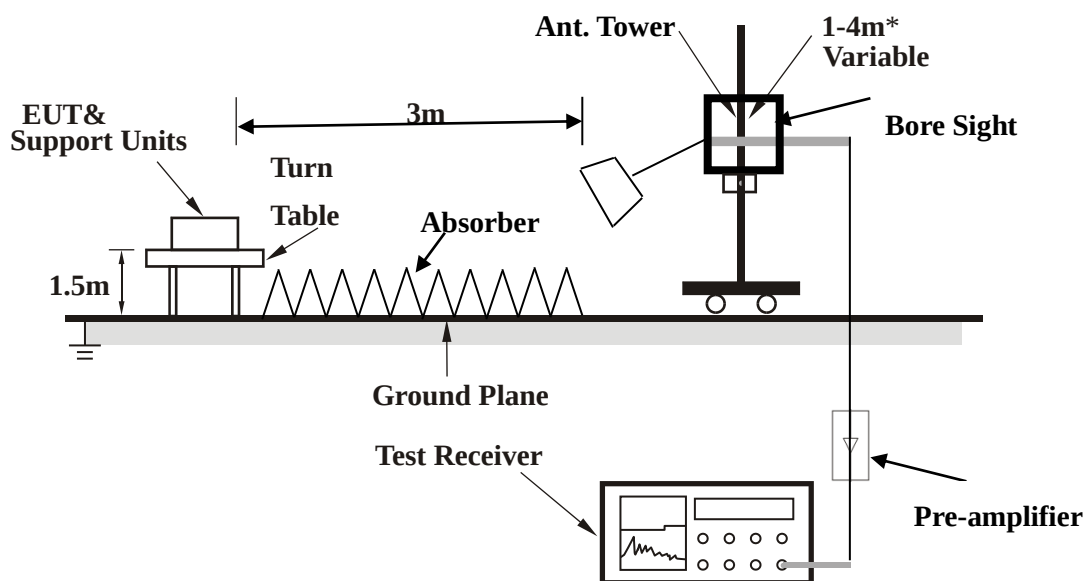


3.2.5 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).



Test Report No.: RF190522W005-7

3.2.6 EUT OPERATING CONDITIONS

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

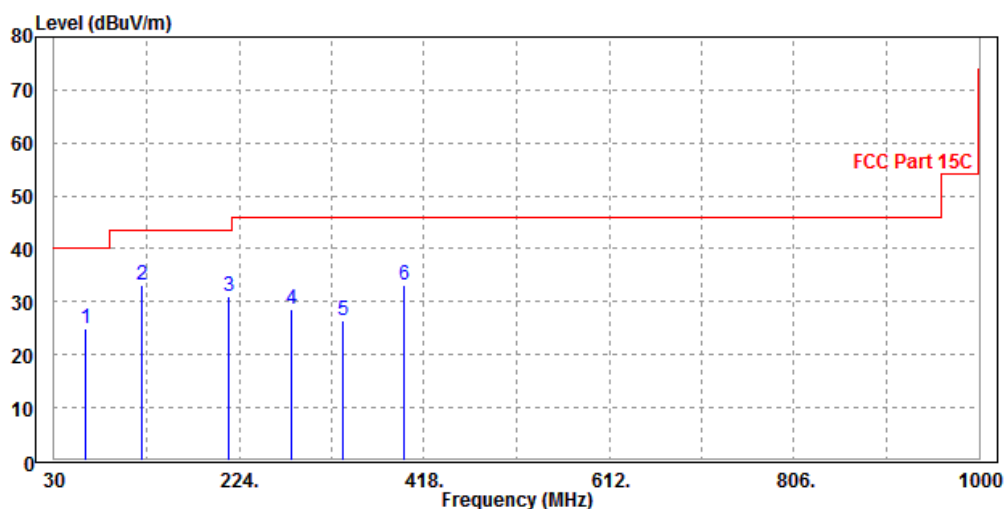
802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
62.35	24.99	54.18	40	-15.01	7.04	1.1	37.33	100	360	QP
121.51	33.14	60.21	43.5	-10.36	8.55	1.45	37.07	100	360	QP
213.06	30.97	54.32	43.5	-12.53	11.37	1.86	36.58	100	360	QP
278.54	28.67	49.61	46	-17.33	13.63	2.14	36.71	100	360	QP
332.16	26.35	45.69	46	-19.65	15.1	2.34	36.78	100	360	QP
396.52	33.15	50.28	46	-12.85	17.09	2.61	36.83	100	360	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.



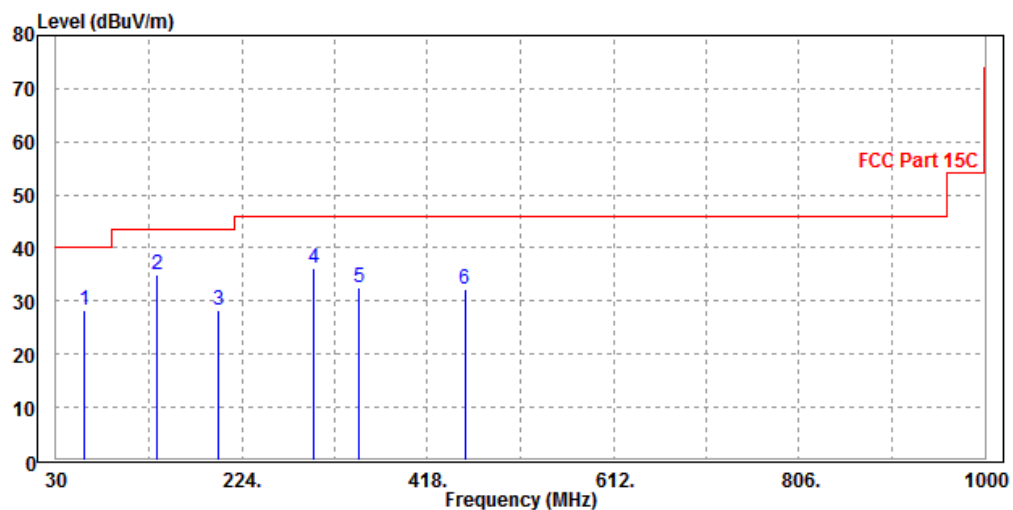


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
60.32	28.41	57.84	40	-11.59	6.83	1.07	37.33	100	0	QP
135.46	34.91	61.59	43.5	-8.59	8.75	1.52	36.95	100	0	QP
199.54	28.34	52.31	43.5	-15.16	10.79	1.79	36.55	100	0	QP
299.36	36.06	56.41	46	-9.94	14.19	2.21	36.75	100	0	QP
345.62	32.51	51.29	46	-13.49	15.61	2.4	36.79	100	0	QP
456.86	32.23	48.23	46	-13.77	18.1	2.83	36.93	100	0	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.





**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	55.87	64.26	74	-18.13	33.1	4.88	46.37	100	275	Peak
2390	41.23	49.62	54	-12.77	33.1	4.88	46.37	100	275	Average
2412	105.91	114.24			33.14	4.9	46.37	100	275	Peak
2412	102.73	111.06			33.14	4.9	46.37	100	275	Average
2483.5	52.46	60.58	74	-21.54	33.27	4.98	46.37	100	275	Peak
2483.5	39.41	47.53	54	-14.59	33.27	4.98	46.37	100	275	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	55.94	65.22	74	-18.06	32.21	4.88	46.37	100	278	Peak
2390	39.05	48.33	54	-14.95	32.21	4.88	46.37	100	278	Average
2412	107.05	116.25			32.27	4.9	46.37	100	278	Peak
2412	104.22	113.42			32.27	4.9	46.37	100	278	Average
2483.5	51.82	60.75	74	-22.18	32.46	4.98	46.37	100	278	Peak
2483.5	38.58	47.51	54	-15.42	32.46	4.98	46.37	100	278	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.2	61.59	74	-20.8	33.1	4.88	46.37	100	265	Peak
2390	39.75	48.14	54	-14.25	33.1	4.88	46.37	100	265	Average
2437	106.31	114.56			33.19	4.93	46.37	100	265	Peak
2437	102.02	110.27			33.19	4.93	46.37	100	265	Average
2483.5	53.17	61.29	74	-20.83	33.27	4.98	46.37	100	265	Peak
2483.5	39.7	47.82	54	-14.3	33.27	4.98	46.37	100	265	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.07	61.35	74	-21.93	32.21	4.88	46.37	100	285	Peak
2390	39.24	48.52	54	-14.76	32.21	4.88	46.37	100	285	Average
2437	107.62	116.72			32.34	4.93	46.37	100	285	Peak
2437	103.28	112.38			32.34	4.93	46.37	100	285	Average
2483.5	52.43	61.36	74	-21.57	32.46	4.98	46.37	100	285	Peak
2483.5	39.28	48.21	54	-14.72	32.46	4.98	46.37	100	285	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.16	61.55	74	-20.84	33.1	4.88	46.37	100	272	Peak
2390	39.85	48.24	54	-14.15	33.1	4.88	46.37	100	272	Average
2462	105.06	113.24			33.23	4.96	46.37	100	272	Peak
2462	101.5	109.68			33.23	4.96	46.37	100	272	Average
2483.5	55.44	63.56	74	-18.56	33.27	4.98	46.37	100	272	Peak
2483.5	40.23	48.35	54	-13.77	33.27	4.98	46.37	100	272	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.32	61.6	74	-21.68	32.21	4.88	46.37	100	255	Peak
2390	39.05	48.33	54	-14.95	32.21	4.88	46.37	100	255	Average
2462	106.83	115.84			32.4	4.96	46.37	100	255	Peak
2462	103.3	112.31			32.4	4.96	46.37	100	255	Average
2483.5	53.42	62.35	74	-20.58	32.46	4.98	46.37	100	255	Peak
2483.5	40.64	49.57	54	-13.36	32.46	4.98	46.37	100	255	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	61.86	70.25	74	-12.14	33.1	4.88	46.37	161	237	Peak
2390	45.04	53.43	54	-8.96	33.1	4.88	46.37	161	237	Average
2412	104.89	113.22			33.14	4.9	46.37	161	237	Peak
2412	95.26	103.59			33.14	4.9	46.37	161	237	Average
2483.5	53.27	61.39	74	-20.73	33.27	4.98	46.37	161	237	Peak
2483.5	40.45	48.57	54	-13.55	33.27	4.98	46.37	161	237	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	66.65	75.93	74	-7.35	32.21	4.88	46.37	100	306	Peak
2390	48.7	57.98	54	-5.3	32.21	4.88	46.37	100	306	Average
2412	107.45	116.65			32.27	4.9	46.37	100	306	Peak
2412	97.16	106.36			32.27	4.9	46.37	100	306	Average
2483.5	53.52	62.45	74	-20.48	32.46	4.98	46.37	100	306	Peak
2483.5	39.83	48.76	54	-14.17	32.46	4.98	46.37	100	306	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	61.86	70.25	74	-12.14	33.1	4.88	46.37	161	237	Peak
2390	45.04	53.43	54	-8.96	33.1	4.88	46.37	161	237	Average
2412	104.89	113.22			33.14	4.9	46.37	161	237	Peak
2412	95.26	103.59			33.14	4.9	46.37	161	237	Average
2483.5	53.27	61.39	74	-20.73	33.27	4.98	46.37	161	237	Peak
2483.5	40.45	48.57	54	-13.55	33.27	4.98	46.37	161	237	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.51	62.79	74	-20.49	32.21	4.88	46.37	135	261	Peak
2390	40.3	49.58	54	-13.7	32.21	4.88	46.37	135	261	Average
2437	106.57	115.67			32.34	4.93	46.37	135	261	Peak
2437	96.38	105.48			32.34	4.93	46.37	135	261	Average
2483.5	52.49	61.42	74	-21.51	32.46	4.98	46.37	135	261	Peak
2483.5	39.3	48.23	54	-14.7	32.46	4.98	46.37	135	261	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.9	61.29	74	-21.1	33.1	4.88	46.37	100	269	Peak
2390	39.77	48.16	54	-14.23	33.1	4.88	46.37	100	269	Average
2462	103.27	111.45			33.23	4.96	46.37	100	269	Peak
2462	93.14	101.32			33.23	4.96	46.37	100	269	Average
2483.5	57.66	65.78	74	-16.34	33.27	4.98	46.37	100	269	Peak
2483.5	43.37	51.49	54	-10.63	33.27	4.98	46.37	100	269	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.04	62.32	74	-20.96	32.21	4.88	46.37	100	252	Peak
2390	38.98	48.26	54	-15.02	32.21	4.88	46.37	100	252	Average
2462	106.63	115.64			32.4	4.96	46.37	100	252	Peak
2462	96.35	105.36			32.4	4.96	46.37	100	252	Average
2483.5	59.59	68.52	74	-14.41	32.46	4.98	46.37	100	252	Peak
2483.5	44.28	53.21	54	-9.72	32.46	4.98	46.37	100	252	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	59.03	67.42	74	-14.97	33.1	4.88	46.37	100	328	Peak
2390	45.88	54.27	54	-8.12	33.1	4.88	46.37	100	328	Average
2412	104.03	112.36			33.14	4.9	46.37	100	328	Peak
2412	94.27	102.6			33.14	4.9	46.37	100	328	Average
2483.5	54.34	62.46	74	-19.66	33.27	4.98	46.37	100	328	Peak
2483.5	40.23	48.35	54	-13.77	33.27	4.98	46.37	100	328	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	64.88	74.16	74	-9.12	32.21	4.88	46.37	100	334	Peak
2390	49.09	58.37	54	-4.91	32.21	4.88	46.37	100	334	Average
2412	107.56	116.76			32.27	4.9	46.37	100	334	Peak
2412	96.93	106.13			32.27	4.9	46.37	100	334	Average
2483.5	52.31	61.24	74	-21.69	32.46	4.98	46.37	100	334	Peak
2483.5	39.52	48.45	54	-14.48	32.46	4.98	46.37	100	334	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.98	62.37	74	-20.02	33.1	4.88	46.37	100	255	Peak
2390	40.13	48.52	54	-13.87	33.1	4.88	46.37	100	255	Average
2437	104.07	112.32			33.19	4.93	46.37	100	255	Peak
2437	94.32	102.57			33.19	4.93	46.37	100	255	Average
2483.5	54.22	62.34	74	-19.78	33.27	4.98	46.37	100	255	Peak
2483.5	40.39	48.51	54	-13.61	33.27	4.98	46.37	100	255	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.18	62.46	74	-20.82	32.21	4.88	46.37	100	263	Peak
2390	39.36	48.64	54	-14.64	32.21	4.88	46.37	100	263	Average
2437	107.57	116.67			32.34	4.93	46.37	100	263	Peak
2437	97.48	106.58			32.34	4.93	46.37	100	263	Average
2483.5	53.38	62.31	74	-20.62	32.46	4.98	46.37	100	263	Peak
2483.5	39.62	48.55	54	-14.38	32.46	4.98	46.37	100	263	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.97	62.36	74	-20.03	33.1	4.88	46.37	100	258	Peak
2390	39.75	48.14	54	-14.25	33.1	4.88	46.37	100	258	Average
2462	102.03	110.21			33.23	4.96	46.37	100	258	Peak
2462	92.18	100.36			33.23	4.96	46.37	100	258	Average
2483.5	57.29	65.41	74	-16.71	33.27	4.98	46.37	100	258	Peak
2483.5	42.27	50.39	54	-11.73	33.27	4.98	46.37	100	258	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.01	61.29	74	-21.99	32.21	4.88	46.37	100	261	Peak
2390	38.85	48.13	54	-15.15	32.21	4.88	46.37	100	261	Average
2462	103.3	112.31			32.4	4.96	46.37	100	261	Peak
2462	93.55	102.56			32.4	4.96	46.37	100	261	Average
2483.5	59.03	67.96	74	-14.97	32.46	4.98	46.37	100	261	Peak
2483.5	41.39	50.32	54	-12.61	32.46	4.98	46.37	100	261	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	63.04	71.43	74	-10.96	33.1	4.88	46.37	100	296	Peak
2390	46.97	55.36	54	-7.03	33.1	4.88	46.37	100	296	Average
2422	101.33	109.62			33.16	4.92	46.37	100	296	Peak
2422	91.05	99.34			33.16	4.92	46.37	100	296	Average
2483.5	54.46	62.58	74	-19.54	33.27	4.98	46.37	100	296	Peak
2483.5	40.55	48.67	54	-13.45	33.27	4.98	46.37	100	296	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	65.55	74.83	74	-8.45	32.21	4.88	46.37	100	342	Peak
2390	49.98	59.26	54	-4.02	32.21	4.88	46.37	100	342	Average
2422	102.59	111.74			32.3	4.92	46.37	100	342	Peak
2422	93.18	102.33			32.3	4.92	46.37	100	342	Average
2483.5	53.19	62.12	74	-20.81	32.46	4.98	46.37	100	342	Peak
2483.5	39.64	48.57	54	-14.36	32.46	4.98	46.37	100	342	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	63.04	71.43	74	-10.96	33.1	4.88	46.37	100	296	Peak
2390	46.97	55.36	54	-7.03	33.1	4.88	46.37	100	296	Average
2437	101.33	109.62			33.16	4.92	46.37	100	296	Peak
2437	91.05	99.34			33.16	4.92	46.37	100	296	Average
2483.5	54.46	62.58	74	-19.54	33.27	4.98	46.37	100	296	Peak
2483.5	40.55	48.67	54	-13.45	33.27	4.98	46.37	100	296	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.08	62.36	74	-20.92	32.21	4.88	46.37	100	325	Peak
2390	38.85	48.13	54	-15.15	32.21	4.88	46.37	100	325	Average
2437	103.24	112.34			32.34	4.93	46.37	100	325	Peak
2437	94.35	103.45			32.34	4.93	46.37	100	325	Average
2483.5	53.44	62.37	74	-20.56	32.46	4.98	46.37	100	325	Peak
2483.5	38.92	47.85	54	-15.08	32.46	4.98	46.37	100	325	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.



CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.04	61.43	74	-20.96	33.1	4.88	46.37	100	325	Peak
2390	39.77	48.16	54	-14.23	33.1	4.88	46.37	100	325	Average
2452	100.33	108.54			33.21	4.95	46.37	100	325	Peak
2452	89.47	97.68			33.21	4.95	46.37	100	325	Average
2483.5	56.45	64.57	74	-17.55	33.27	4.98	46.37	100	325	Peak
2483.5	42.24	50.36	54	-11.76	33.27	4.98	46.37	100	325	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.08	61.36	74	-21.92	32.21	4.88	46.37	100	312	Peak
2390	38.85	48.13	54	-15.15	32.21	4.88	46.37	100	312	Average
2452	101.27	110.31			32.38	4.95	46.37	100	312	Peak
2452	91.59	100.63			32.38	4.95	46.37	100	312	Average
2483.5	57.52	66.45	74	-16.48	32.46	4.98	46.37	100	312	Peak
2483.5	42.49	51.42	54	-11.51	32.46	4.98	46.37	100	312	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2452MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

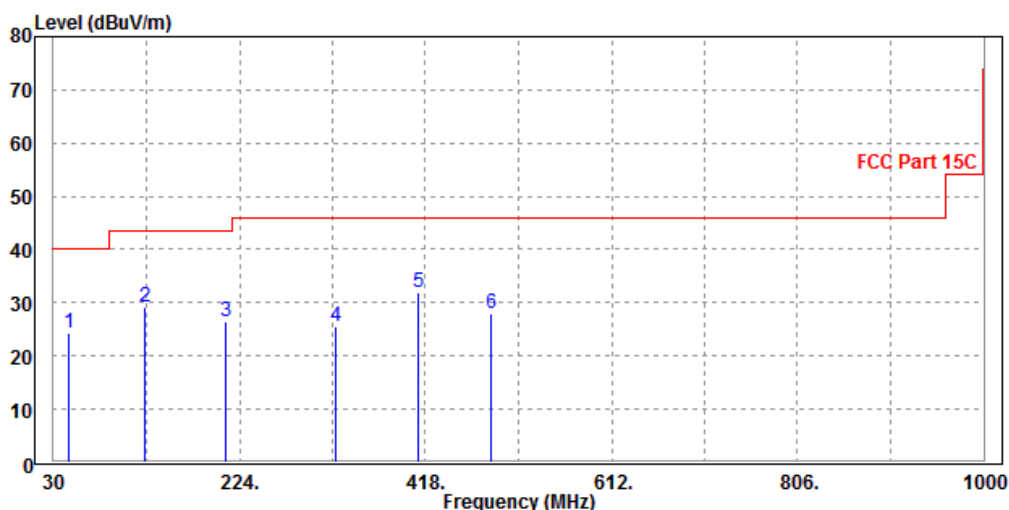
BT-LE_4.0

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
45.63	24.38	53.3	40	-15.62	7.45	1.03	37.4	100	0	QP
125.45	29.21	56.12	43.5	-14.29	8.66	1.47	37.04	100	0	QP
210.36	26.38	49.85	43.5	-17.12	11.26	1.84	36.57	100	0	QP
324.81	25.64	45.23	46	-20.36	14.87	2.31	36.77	100	0	QP
411.25	31.8	48.64	46	-14.2	17.35	2.66	36.85	100	0	QP
485.62	27.84	43.57	46	-18.16	18.31	2.94	36.98	100	0	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





**BUREAU
VERITAS**

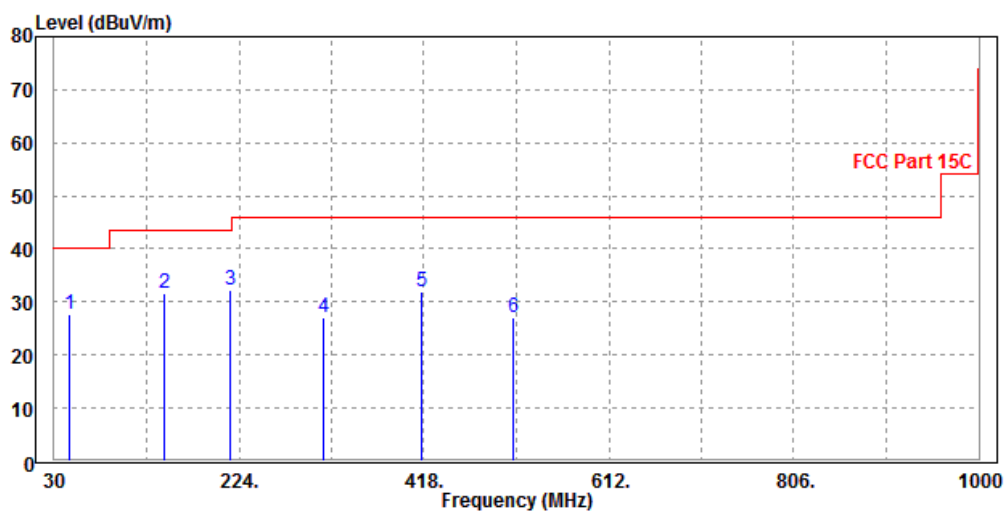
Test Report No.: RF190522W005-7

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
45.69	27.72	56.52	40	-12.28	7.57	1.03	37.4	100	360	QP
145.63	31.49	57.48	43.5	-12.01	9.31	1.56	36.86	100	360	QP
215.34	32.23	55.4	43.5	-11.27	11.54	1.87	36.58	100	360	QP
312.52	27.04	46.95	46	-18.96	14.59	2.26	36.76	100	360	QP
415.26	31.85	48.52	46	-14.15	17.51	2.68	36.86	100	360	QP
511.24	26.97	42.14	46	-19.03	18.86	3.01	37.04	100	360	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

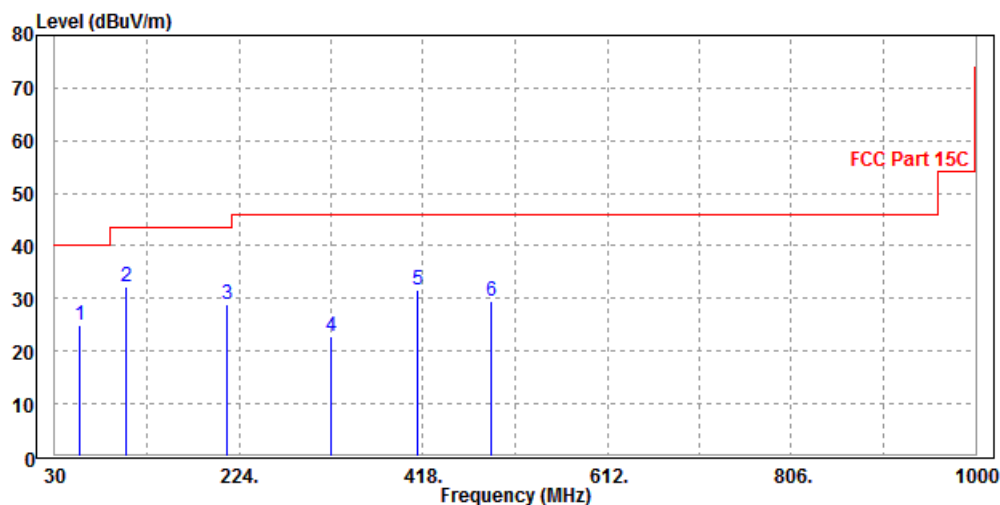
BT-LE_5.0

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.31	24.97	54.29	40	-15.03	6.97	1.04	37.33	100	0	QP
105.64	32.36	58.79	43.5	-11.14	9.36	1.35	37.14	100	0	QP
211.34	28.86	52.28	43.5	-14.64	11.3	1.85	36.57	100	0	QP
321.45	22.86	42.57	46	-23.14	14.76	2.3	36.77	100	0	QP
412.31	31.69	48.51	46	-14.31	17.36	2.67	36.85	100	0	QP
489.63	29.45	45.11	46	-16.55	18.37	2.95	36.98	100	0	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





**BUREAU
VERITAS**

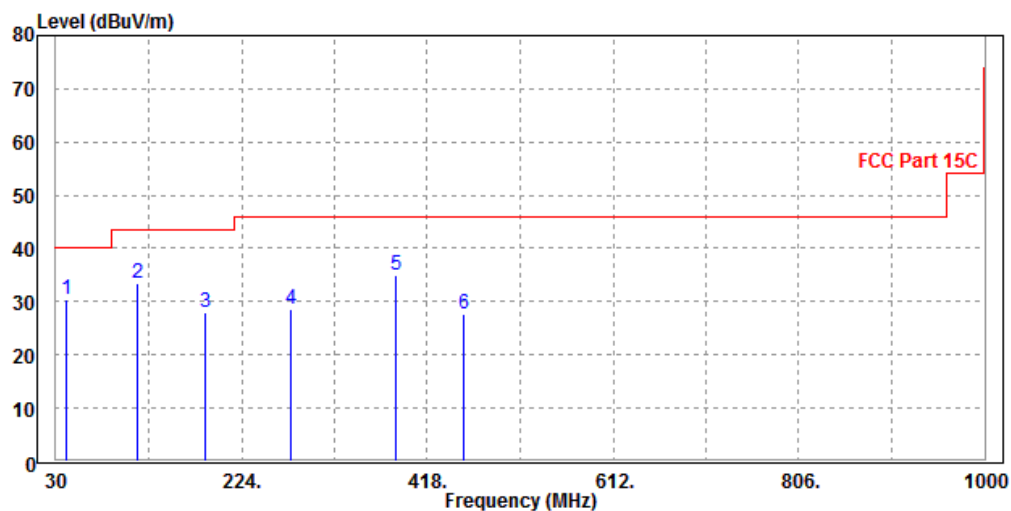
Test Report No.: RF190522W005-7

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
41.25	30.32	54.69	40	-9.68	12.18	0.94	37.49	100	360	QP
115.28	33.6	60.32	43.5	-9.9	8.96	1.42	37.1	100	360	QP
185.64	28	52.37	43.5	-15.5	10.51	1.73	36.61	100	360	QP
275.45	28.74	49.6	46	-17.26	13.71	2.13	36.7	100	360	QP
385.62	34.91	52.32	46	-11.09	16.85	2.56	36.82	100	360	QP
455.67	27.57	43.58	46	-18.43	18.08	2.83	36.92	100	360	QP

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

ABOVE 1GHz TEST DATA:

Note: For higher frequency, the emission is too low to be detected.

BT-LE_4.0

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.21	61.6	74	-20.79	33.1	4.88	46.37	100	310	Peak
2390	39.94	48.33	54	-14.06	33.1	4.88	46.37	100	310	Average
2402	101.19	109.55			33.12	4.89	46.37	100	310	Peak
2402	93.97	102.33			33.12	4.89	46.37	100	310	Average
2483.5	52.73	60.85	74	-21.27	33.27	4.98	46.37	100	310	Peak
2483.5	39.42	47.54	54	-14.58	33.27	4.98	46.37	100	310	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.57	61.85	74	-21.43	32.21	4.88	46.37	100	315	Peak
2390	39.24	48.52	54	-14.76	32.21	4.88	46.37	100	315	Average
2402	96.41	105.64			32.25	4.89	46.37	100	315	Peak
2402	88.19	97.42			32.25	4.89	46.37	100	315	Average
2483.5	51.96	60.89	74	-22.04	32.46	4.98	46.37	100	315	Peak
2483.5	38.72	47.65	54	-15.28	32.46	4.98	46.37	100	315	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 2402MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.19	61.58	74	-20.81	33.1	4.88	46.37	100	211	Peak
2390	39.86	48.25	54	-14.14	33.1	4.88	46.37	100	211	Average
2440	98.54	106.78			33.19	4.94	46.37	100	211	Peak
2440	87.1	95.34			33.19	4.94	46.37	100	211	Average
2483.5	53.47	61.59	74	-20.53	33.27	4.98	46.37	100	211	Peak
2483.5	40.4	48.52	54	-13.6	33.27	4.98	46.37	100	211	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.28	60.56	74	-22.72	32.21	4.88	46.37	100	115	Peak
2390	38.18	47.46	54	-15.82	32.21	4.88	46.37	100	115	Average
2440	100.54	109.63			32.34	4.94	46.37	100	115	Peak
2440	93.32	102.41			32.34	4.94	46.37	100	115	Average
2483.5	51.92	60.85	74	-22.08	32.46	4.98	46.37	100	115	Peak
2483.5	39.19	48.12	54	-14.81	32.46	4.98	46.37	100	115	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	53.14	61.53	74	-20.86	33.1	4.88	46.37	100	236	Peak
2390	39.85	48.24	54	-14.15	33.1	4.88	46.37	100	236	Average
2480	97.08	105.21			33.26	4.98	46.37	100	236	Peak
2480	89.35	97.48			33.26	4.98	46.37	100	236	Average
2483.5	53.23	61.35	74	-20.77	33.27	4.98	46.37	100	266	Peak
2483.5	40.13	48.25	54	-13.87	33.27	4.98	46.37	100	236	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.6	60.88	74	-22.4	32.21	4.88	46.37	100	125	Peak
2390	38.18	47.46	54	-15.82	32.21	4.88	46.37	100	125	Average
2480	100.9	109.84			32.45	4.98	46.37	100	125	Peak
2480	93.42	102.36			32.45	4.98	46.37	100	125	Average
2483.5	52.65	61.58	74	-21.35	32.46	4.98	46.37	100	125	Peak
2483.5	39.61	48.54	54	-14.39	32.46	4.98	46.37	100	125	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

BT-LE_5.0

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	57.79	61.25	74	-16.21	33.1	4.88	41.44	100	35	Peak
2390	44.9	48.36	54	-9.1	33.1	4.88	41.44	100	35	Average
2402	102.05	105.48			33.12	4.89	41.44	100	35	Peak
2402	95.1	98.53			33.12	4.89	41.44	100	35	Average
2483.5	57.67	60.88	74	-16.33	33.27	4.98	41.46	100	35	Peak
2483.5	44.25	47.46	54	-9.75	33.27	4.98	41.46	100	35	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	57.23	61.58	74	-16.77	32.21	4.88	41.44	100	23	Peak
2390	44.21	48.56	54	-9.79	32.21	4.88	41.44	100	23	Average
2402	105.02	109.32			32.25	4.89	41.44	100	23	Peak
2402	98.11	102.41			32.25	4.89	41.44	100	23	Average
2483.5	56.83	60.85	74	-17.17	32.46	4.98	41.46	100	23	Peak
2483.5	43.44	47.46	54	-10.56	32.46	4.98	41.46	100	23	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2402MHz: Fundamental frequency.



CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	58.08	61.54	74	-15.92	33.1	4.88	41.44	100	45	Peak
2390	44.77	48.23	54	-9.23	33.1	4.88	41.44	100	45	Average
2440	102.92	106.24			33.19	4.94	41.45	100	45	Peak
2440	95.33	98.65			33.19	4.94	41.45	100	45	Average
2483.5	58.34	61.55	74	-15.66	33.27	4.98	41.46	100	45	Peak
2483.5	44.69	47.9	54	-9.31	33.27	4.98	41.46	100	45	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	57.19	61.54	74	-16.81	32.21	4.88	41.44	100	36	Peak
2390	43.8	48.15	54	-10.2	32.21	4.88	41.44	100	36	Average
2440	104.42	108.59			32.34	4.94	41.45	100	36	Peak
2440	98.14	102.31			32.34	4.94	41.45	100	36	Average
2483.5	56.55	60.57	74	-17.45	32.46	4.98	41.46	100	36	Peak
2483.5	43.83	47.85	54	-10.17	32.46	4.98	41.46	100	36	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2440MHz: Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	56.99	60.45	74	-17.01	33.1	4.88	41.44	100	23	Peak
2390	44.43	47.89	54	-9.57	33.1	4.88	41.44	100	23	Average
2480	101.91	105.13			33.26	4.98	41.46	100	23	Peak
2480	93.17	96.39			33.26	4.98	41.46	100	23	Average
2483.5	58.05	61.26	74	-15.95	33.27	4.98	41.46	100	23	Peak
2483.5	44.95	48.16	54	-9.05	33.27	4.98	41.46	100	23	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	56.9	61.25	74	-17.1	32.21	4.88	41.44	100	45	Peak
2390	43.5	47.85	54	-10.5	32.21	4.88	41.44	100	45	Average
2480	105.84	109.87			32.45	4.98	41.46	100	45	Peak
2480	99.59	103.62			32.45	4.98	41.46	100	45	Average
2483.5	57.4	61.42	74	-16.6	32.46	4.98	41.46	100	45	Peak
2483.5	43.84	47.86	54	-10.16	32.46	4.98	41.46	100	45	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 2480MHz: Fundamental frequency.



3.3 6 dB BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Feb. 26,19	Feb. 25,20
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 26,19	Feb. 25,20

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

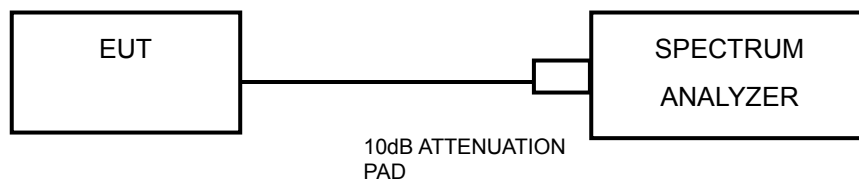
3.3.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



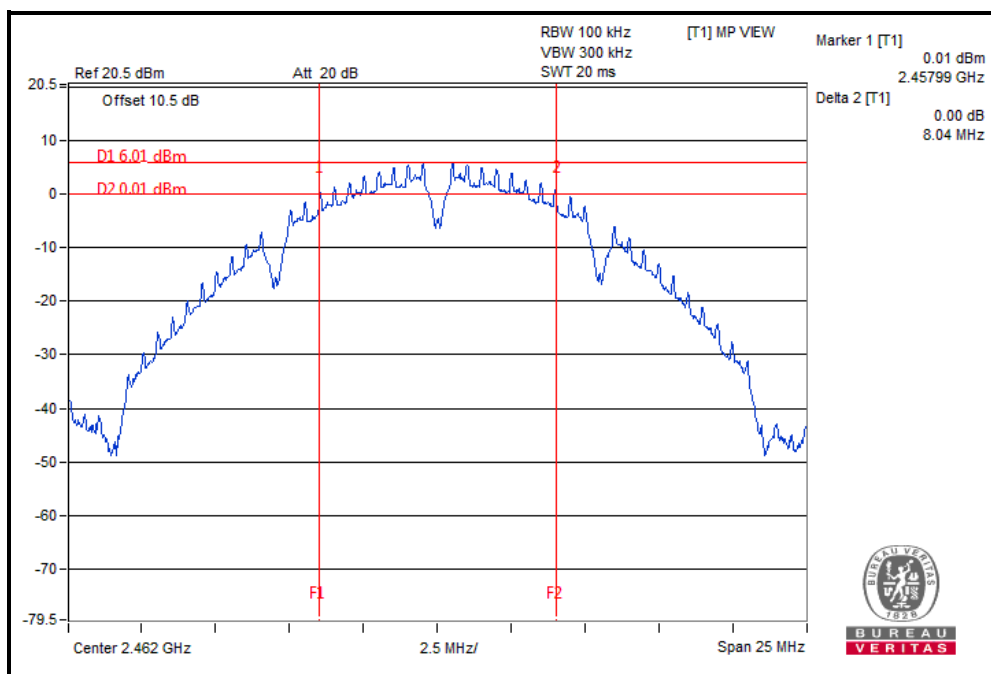
BUREAU
VERITAS

Test Report No.: RF190522W005-7

3.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain0	Chain1		
1	2412	7.56	7.54	0.5	PASS
6	2437	7.09	7.56	0.5	PASS
11	2462	8.04	7.56	0.5	PASS



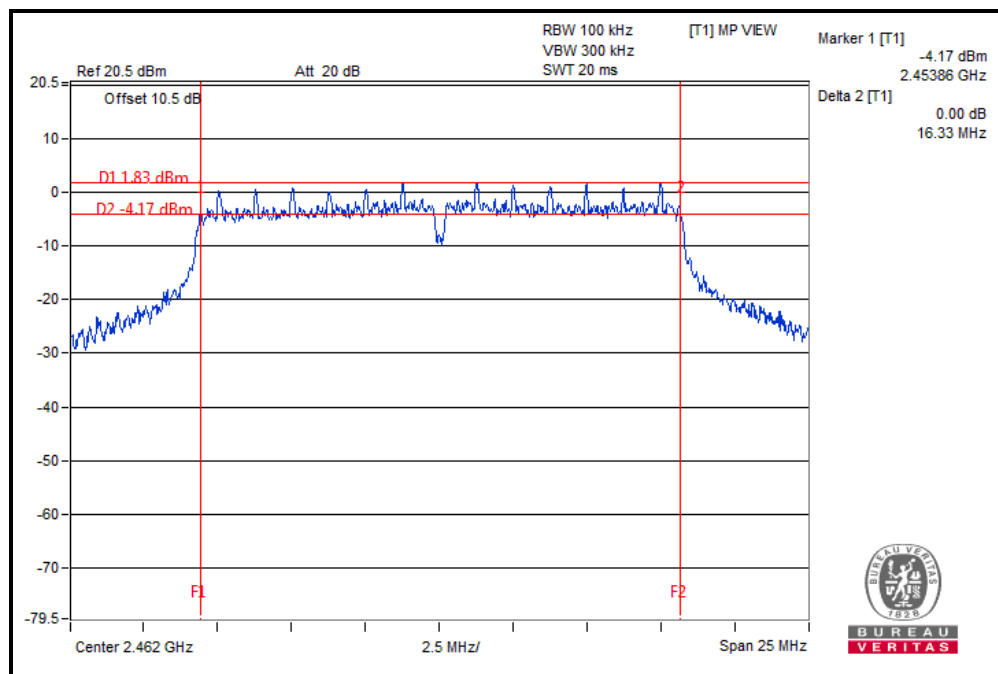


BUREAU
VERITAS

Test Report No.: RF190522W005-7

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain0	Chain1		
1	2412	16.05	15.72	0.5	PASS
6	2437	15.12	15.73	0.5	PASS
11	2462	16.33	15.14	0.5	PASS



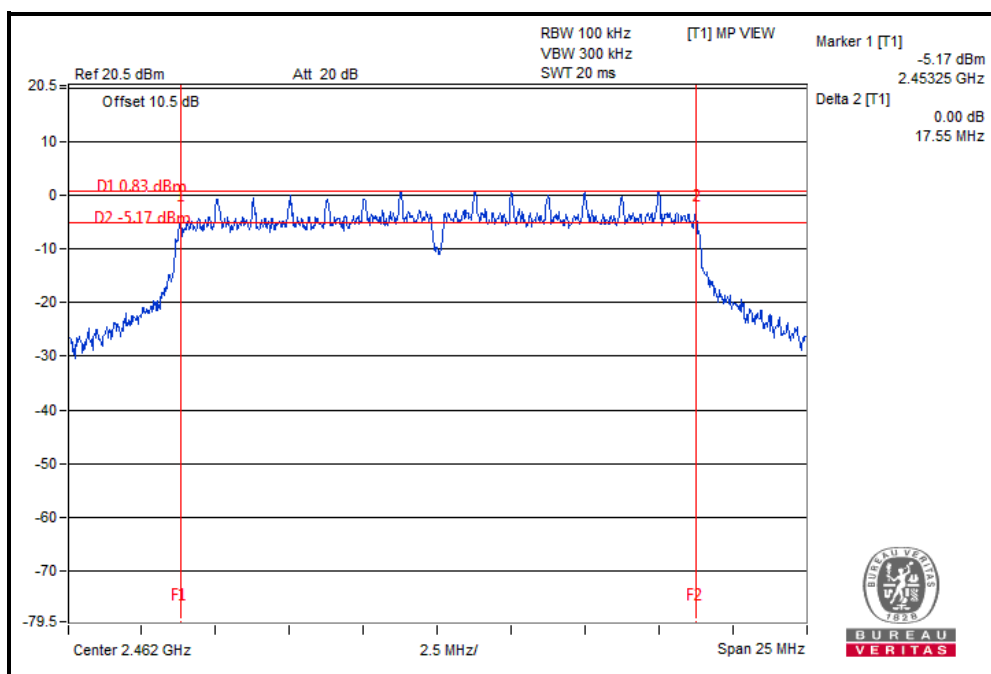


BUREAU
VERITAS

Test Report No.: RF190522W005-7

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain0	Chain1		
1	2412	17.17	16.34	0.5	PASS
6	2437	15.12	16.94	0.5	PASS
11	2462	17.55	15.72	0.5	PASS



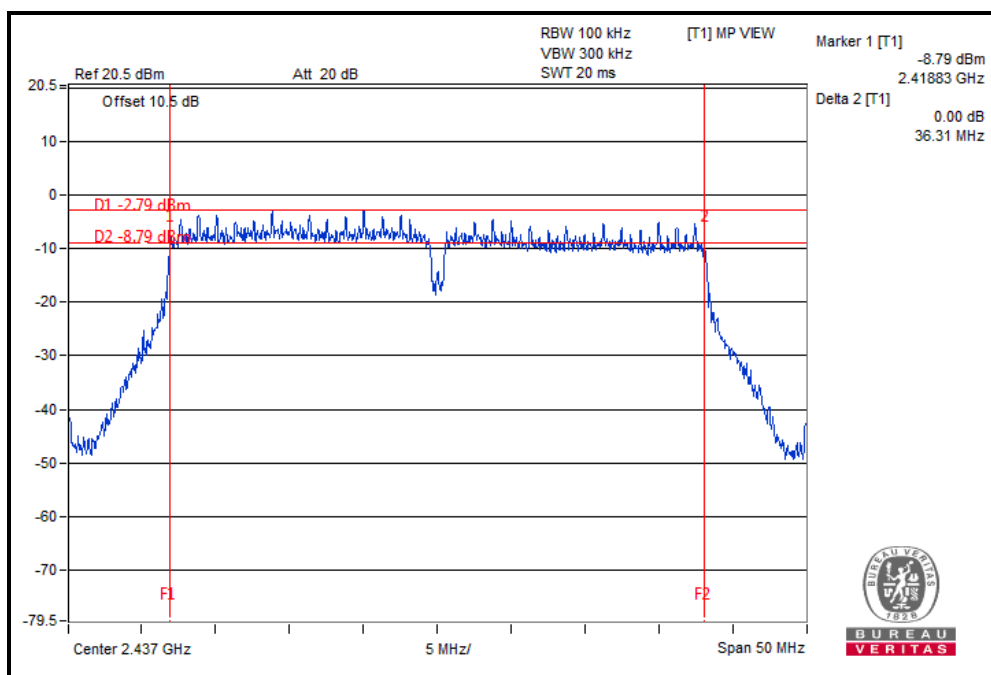


BUREAU
VERITAS

Test Report No.: RF190522W005-7

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain0	Chain1		
1	2412	36.07	35.08	0.5	PASS
6	2437	35.09	36.31	0.5	PASS
11	2462	35.75	35.69	0.5	PASS



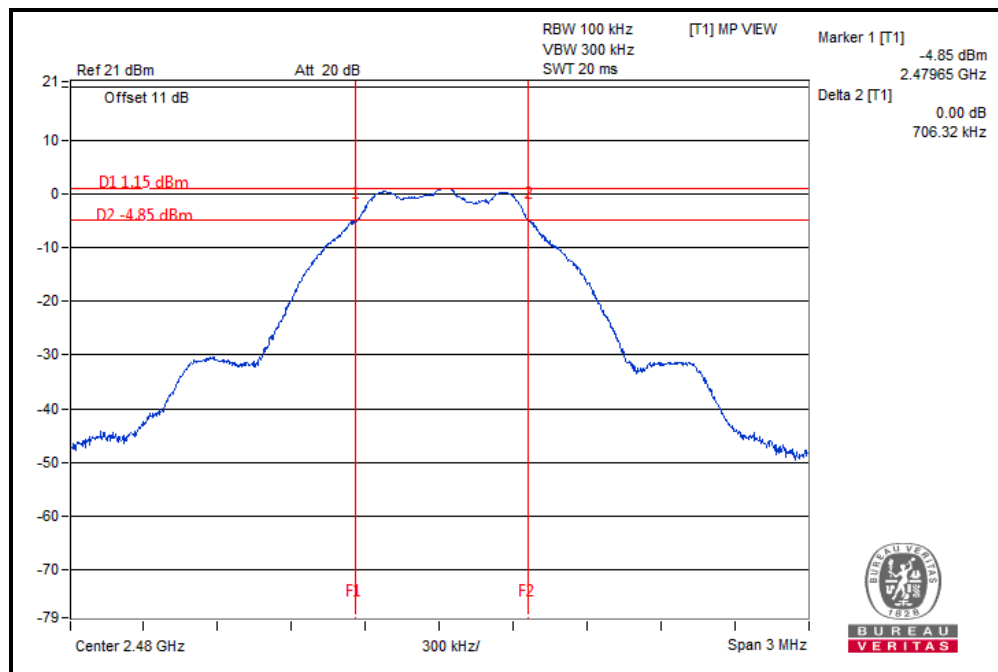


BUREAU
VERITAS

Test Report No.: RF190522W005-7

BT-LE_4.0

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.69	0.5	PASS
19	2440	0.70	0.5	PASS
39	2480	0.71	0.5	PASS



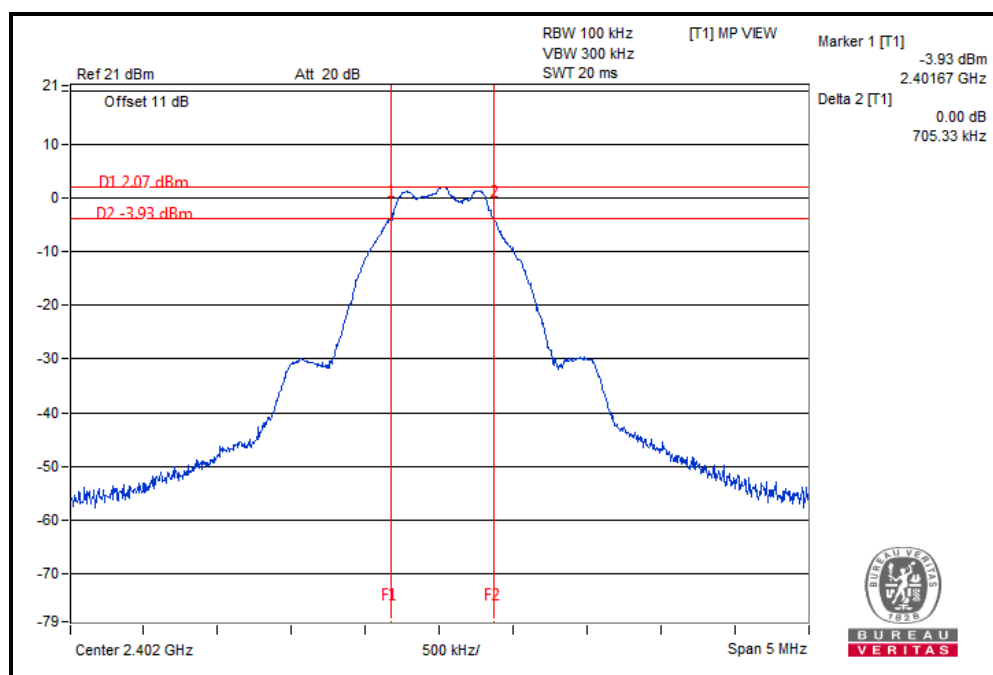


BUREAU
VERITAS

Test Report No.: RF190522W005-7

BT-LE_5.0

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	0.71	0.5	PASS
19	2440	0.71	0.5	PASS
39	2480	0.71	0.5	PASS



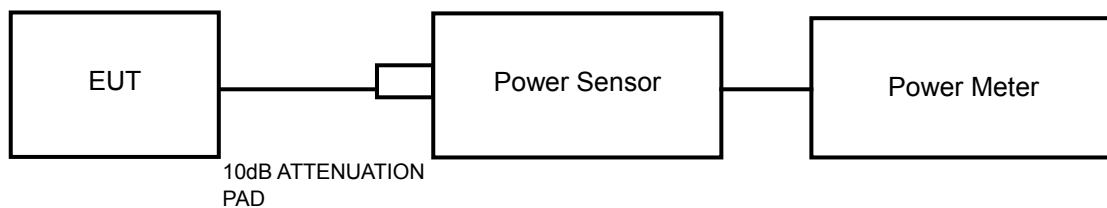


3.4 CONDUCTED OUTPUT POWER

3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



3.4.7 TEST RESULTS

3.4.7.1 MAXIMUM PEAK OUTPUT POWER

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/ FAIL
		Chain 0	Chain 1	Chain 0	Chain 1				
1	2412	15.75	16.17	37.584	41.400	18.98	79.07	1	PASS
6	2437	16.39	16.33	43.551	42.954	19.37	86.50	1	PASS
11	2462	15.93	16.13	39.174	41.020	19.04	80.17	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/ FAIL
		Chain 0	Chain 1	Chain 0	Chain 1				
1	2412	16.15	16.11	41.210	40.832	19.14	82.04	1	PASS
6	2437	16.53	16.38	44.978	43.451	19.47	88.51	1	PASS
11	2462	15.98	16.23	39.628	41.976	19.12	81.66	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/ FAIL
		Chain 0	Chain 1	Chain 0	Chain 1				
1	2412	15.68	15.22	36.983	33.266	18.47	70.31	1	PASS
6	2437	15.86	15.30	38.548	33.884	18.60	72.44	1	PASS
11	2462	15.27	15.13	33.651	32.584	18.21	66.22	1	PASS



802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/ FAIL
		Chain 0	Chain 1	Chain 0	Chain 1				
3	2422	17.71	17.08	59.020	51.050	20.42	110.15	1	PASS
6	2437	16.65	16.65	46.238	46.238	19.66	92.47	1	PASS
9	2452	17.75	17.25	59.566	53.088	20.52	112.72	1	PASS

BT-LE_4.0

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
0	2402	1.49	1.409	1	PASS
19	2440	1.52	1.419	1	PASS
39	2480	-0.08	0.982	1	PASS

BT-LE_5.0

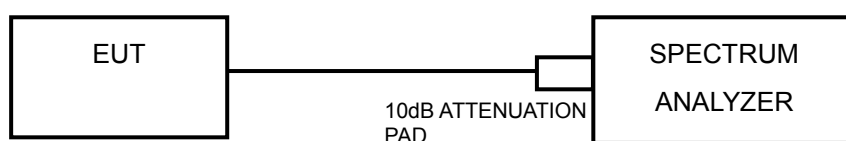
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
0	2402	1.65	1.462	1	PASS
19	2440	1.12	1.294	1	PASS
39	2480	-0.19	0.957	1	PASS

3.5 POWER SPECTRAL DENSITY MEASUREMENT

3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW $\geq 3 \times$ RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

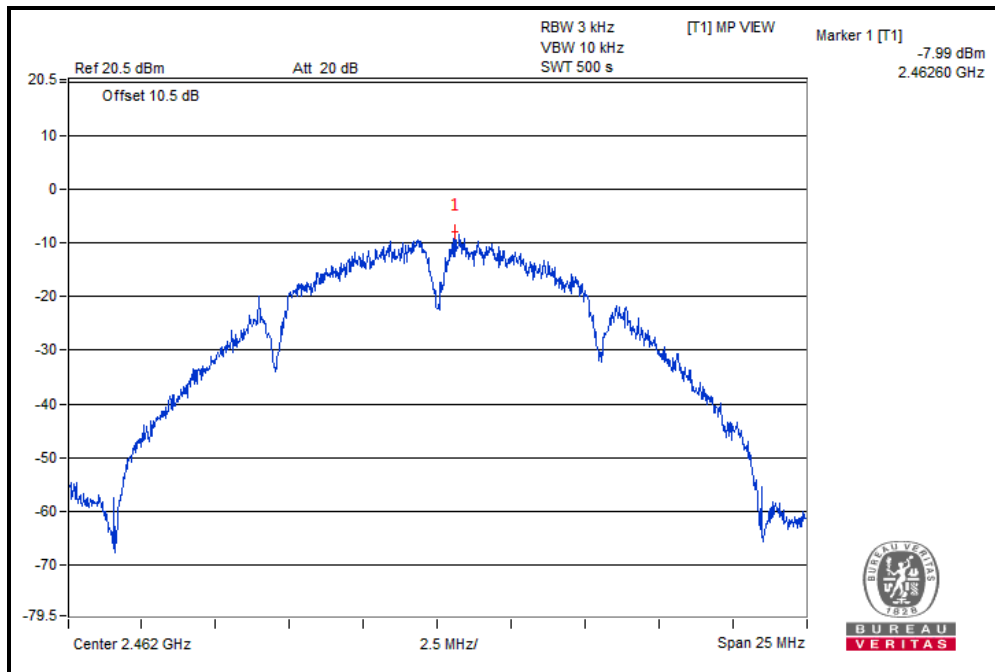
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



3.5.7 TEST RESULTS

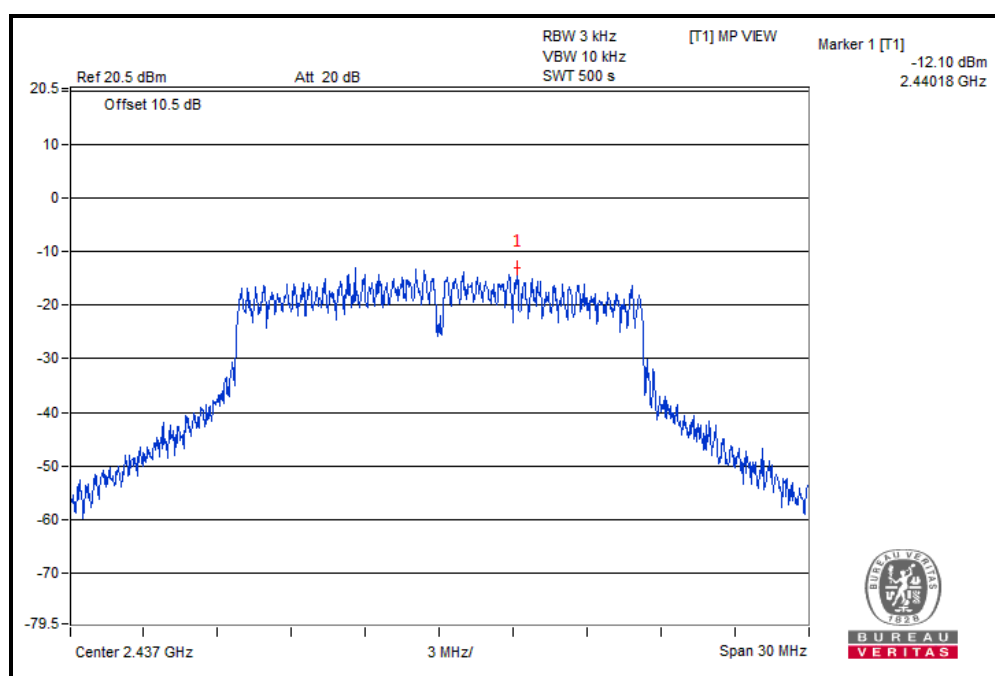
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		ANT 0	ANT 1			
1	2412	-9.10	-9.39	-6.20	8	PASS
6	2437	-8.52	-8.52	-5.53	8	PASS
11	2462	-7.99	-8.15	-5.09	8	PASS



802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		ANT 0	ANT 1			
1	2412	-12.40	-13.43	-9.59	8	PASS
6	2437	-12.10	-13.53	-10.00	8	PASS
11	2462	-12.10	-13.85	-10.00	8	PASS



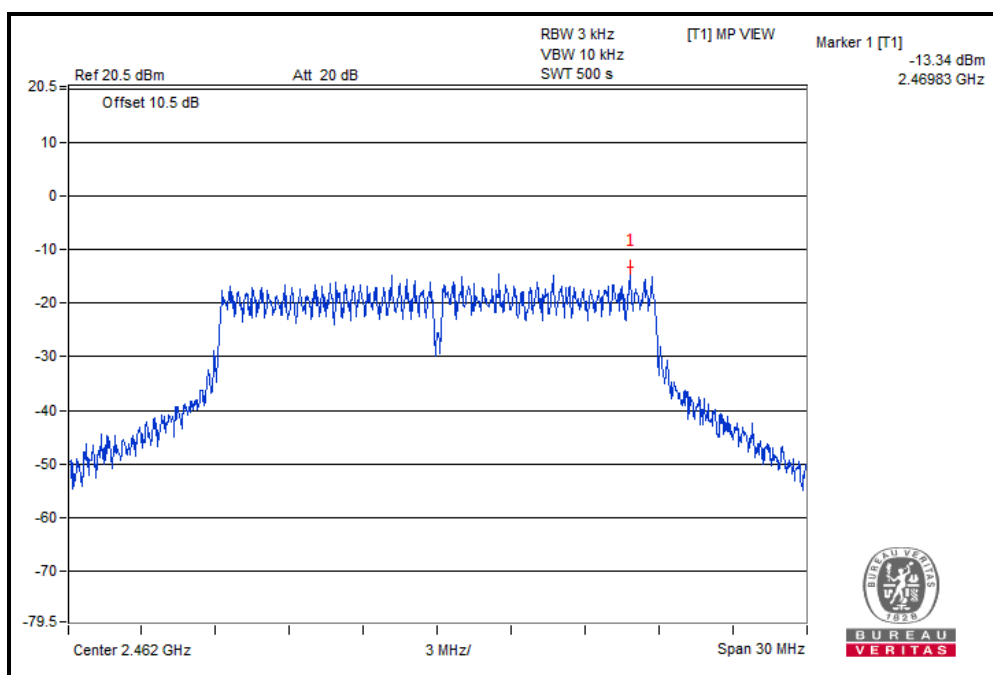


BUREAU
VERITAS

Test Report No.: RF190522W005-7

802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		ANT 0	ANT 1			
1	2412	-13.91	-14.52	-10.97	8	PASS
6	2437	-13.39	-14.37	-10.46	8	PASS
11	2462	-13.34	-14.51	-10.46	8	PASS



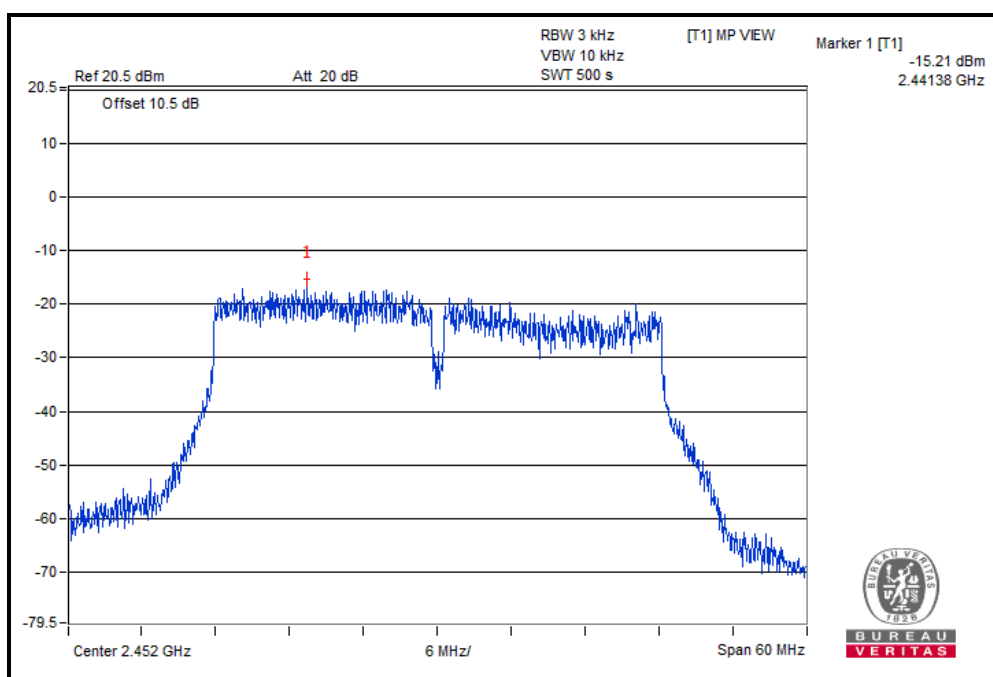


BUREAU
VERITAS

Test Report No.: RF190522W005-7

802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		ANT 0	ANT 1			
1	2412	-17.23	-17.55	-13.98	8	PASS
6	2437	-15.90	-18.27	-13.98	8	PASS
11	2462	-15.21	-17.19	-13.01	8	PASS



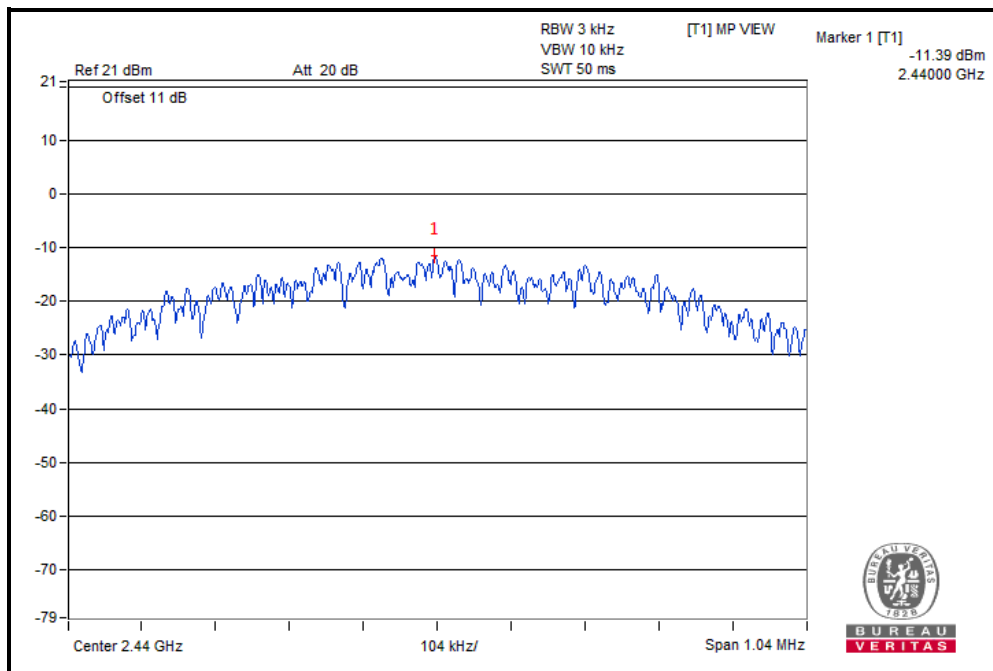


**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

BT-LE 4.0

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-11.52	8	PASS
19	2440	-11.39	8	PASS
39	2480	-11.86	8	PASS



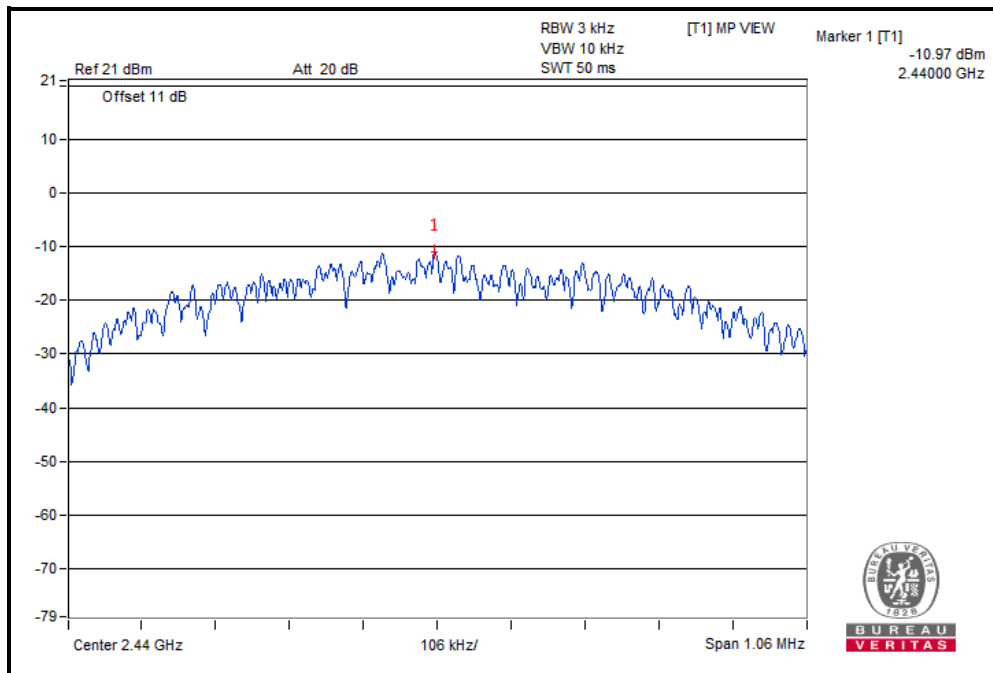


**BUREAU
VERITAS**

Test Report No.: RF190522W005-7

BT-LE 5.0

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	-11.58	8	PASS
19	2440	-10.97	8	PASS
39	2480	-11.88	8	PASS

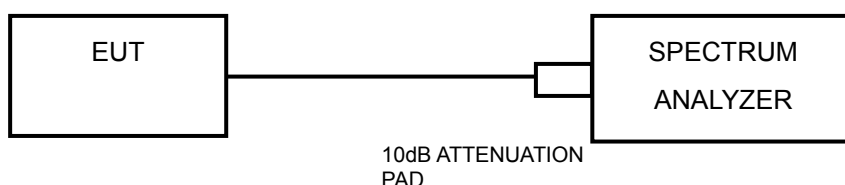


3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 TEST SETUP



3.6.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

3.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

3.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

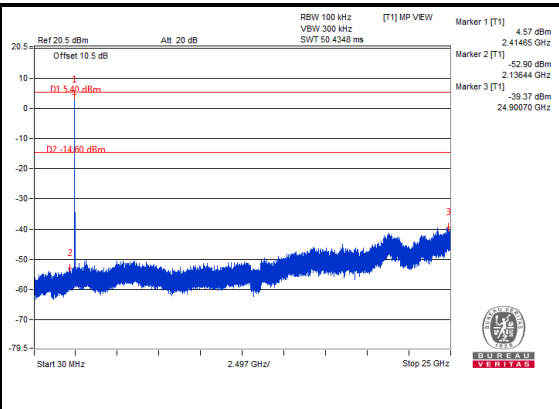
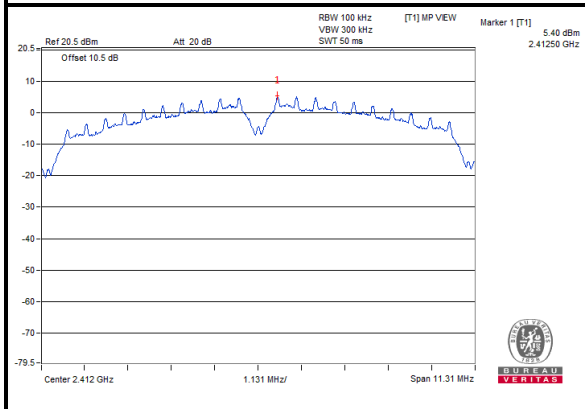


BUREAU
VERITAS

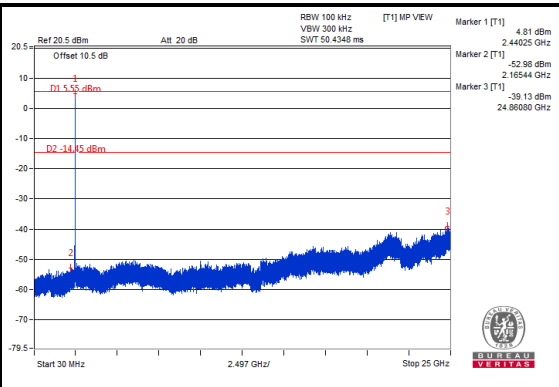
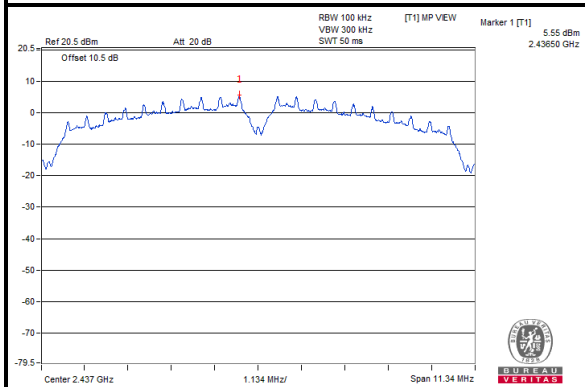
Test Report No.: RF190522W005-7

802.11b

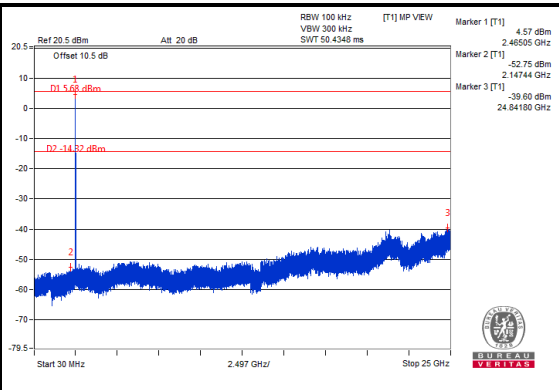
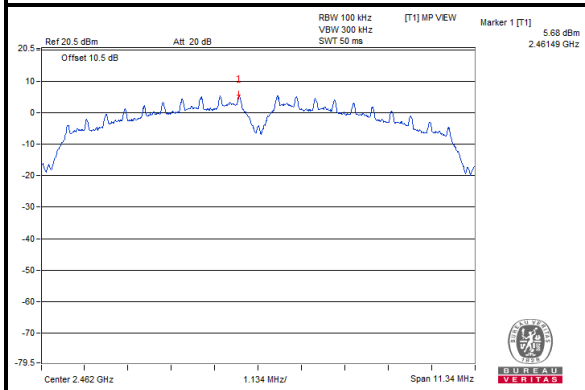
CH 1



CH 6



CH 11

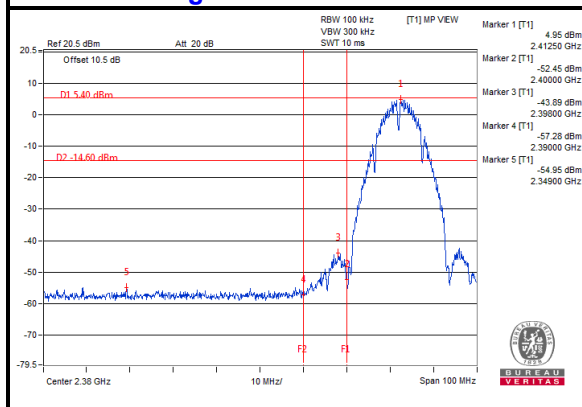




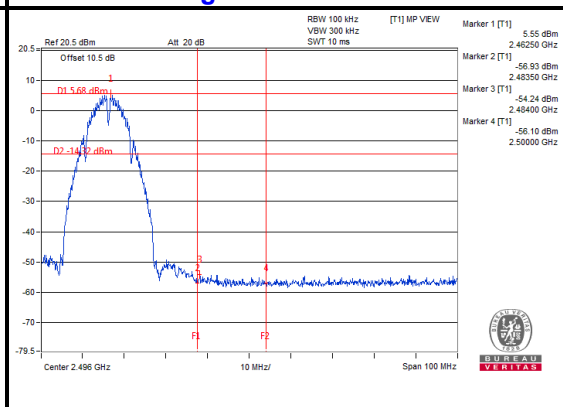
BUREAU
VERITAS

Test Report No.: RF190522W005-7

CH 1 Band Edge



CH 11 Band Edge



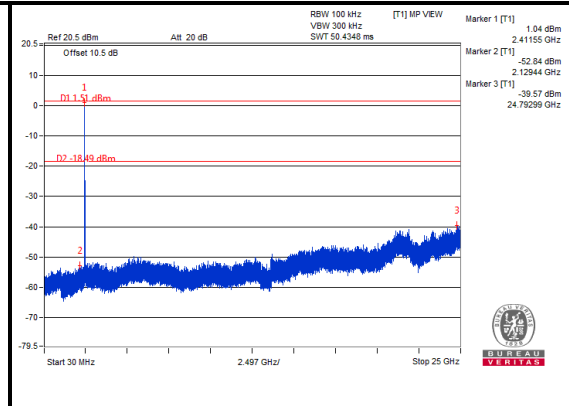
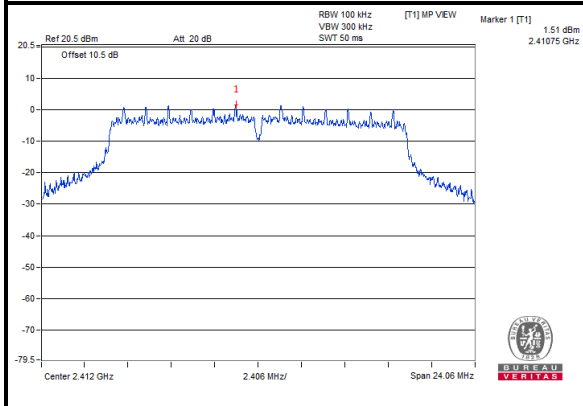


BUREAU
VERITAS

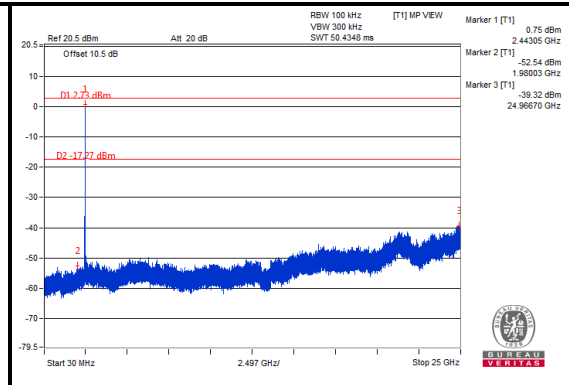
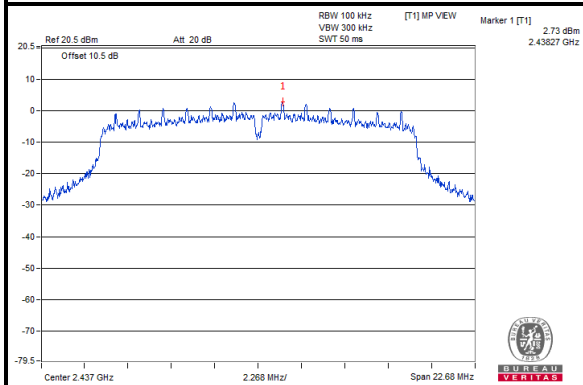
Test Report No.: RF190522W005-7

802.11g

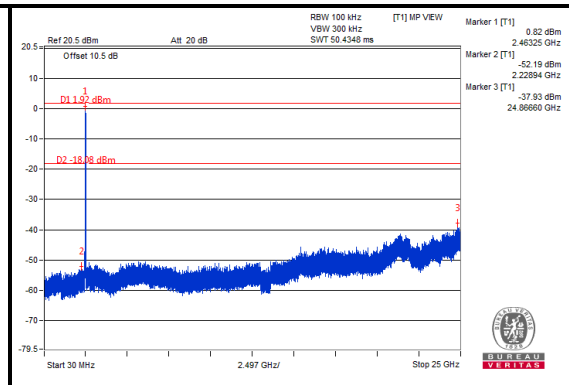
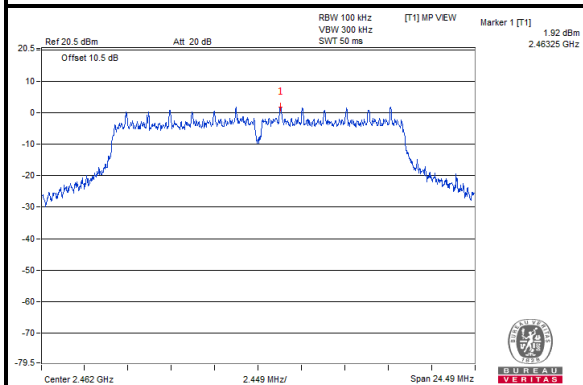
CH 1



CH 6



CH 11

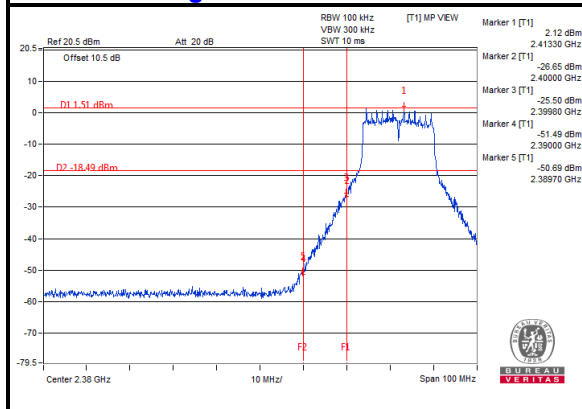




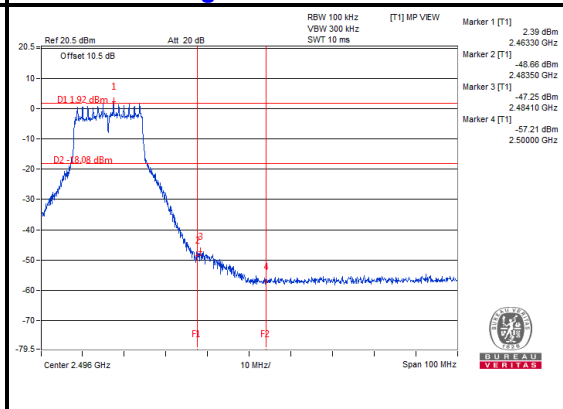
BUREAU
VERITAS

Test Report No.: RF190522W005-7

CH 1 Band Edge



CH 11 Band Edge



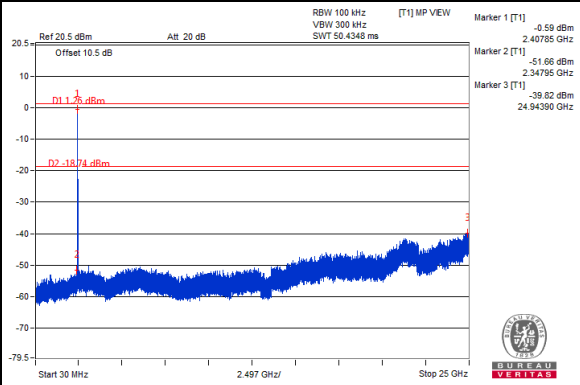
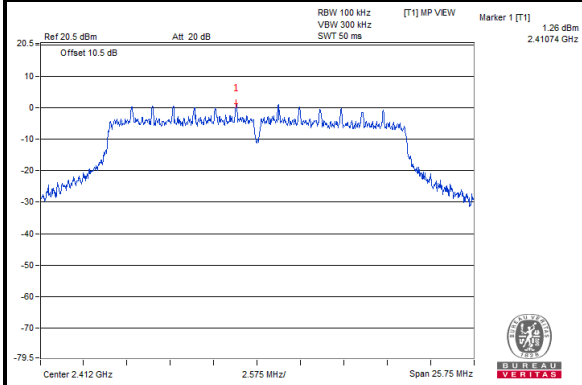


BUREAU
VERITAS

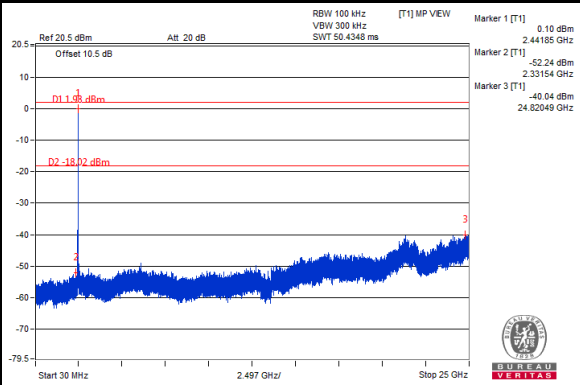
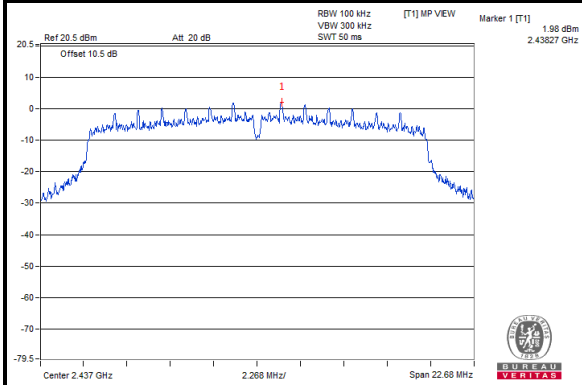
Test Report No.: RF190522W005-7

802.11n (20MHz)

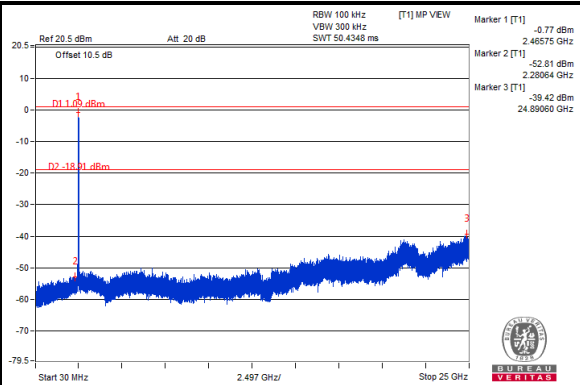
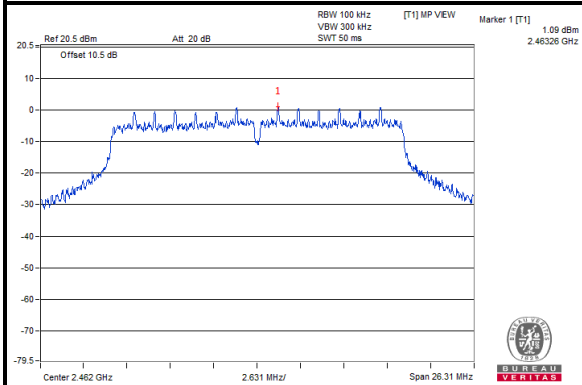
CH 1



CH 6



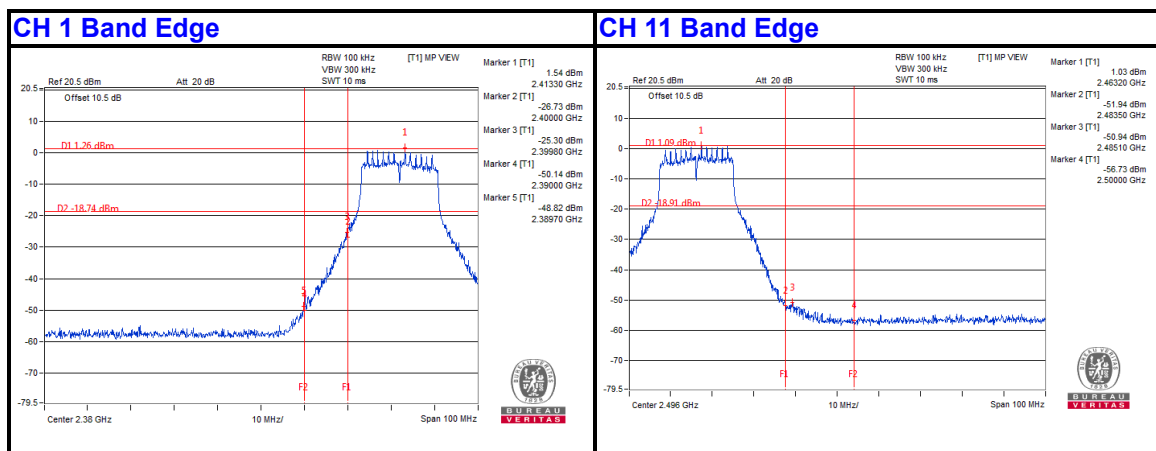
CH 11





BUREAU
VERITAS

Test Report No.: RF190522W005-7



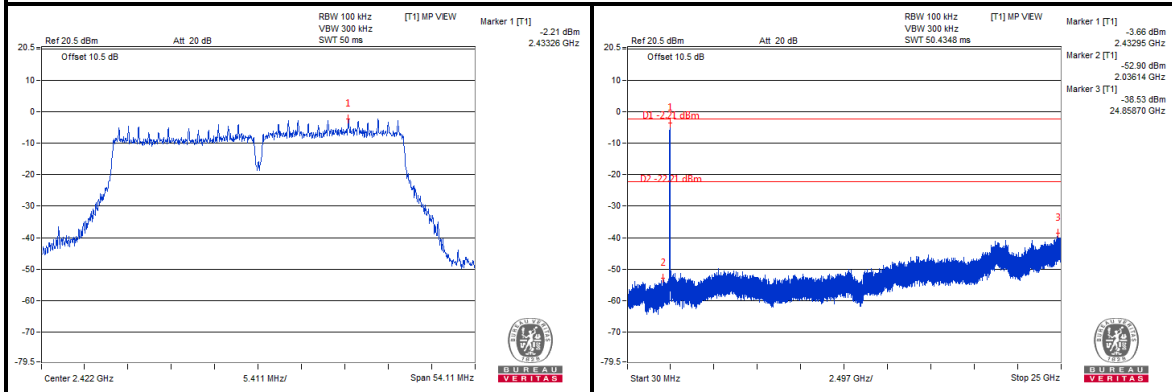


**BUREAU
VERITAS**

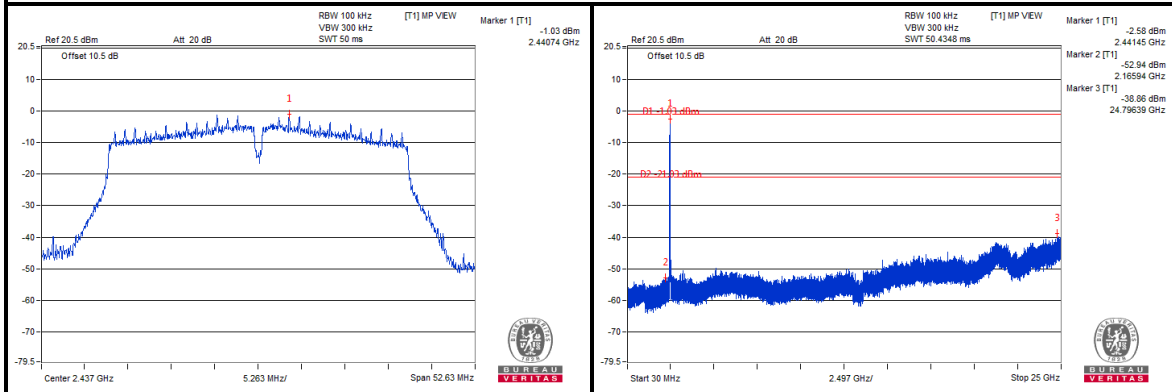
Test Report No.: RF190522W005-7

802.11n (40MHz)

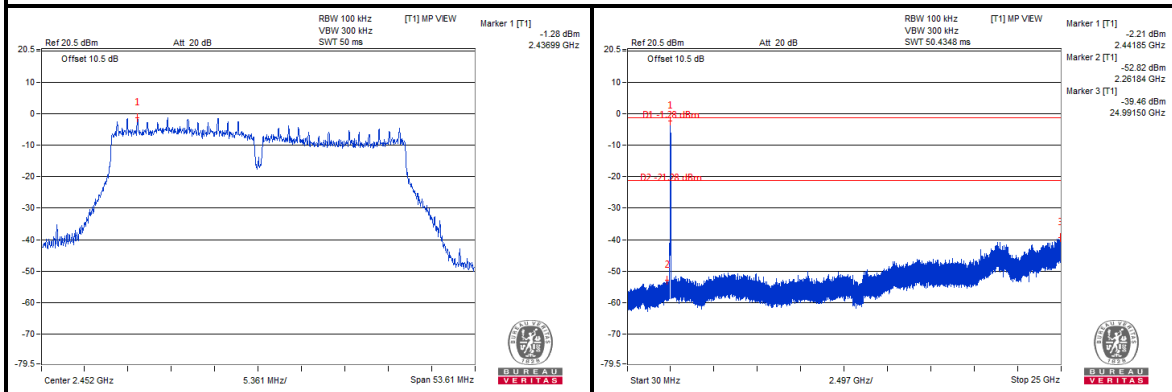
CH 3



CH 6



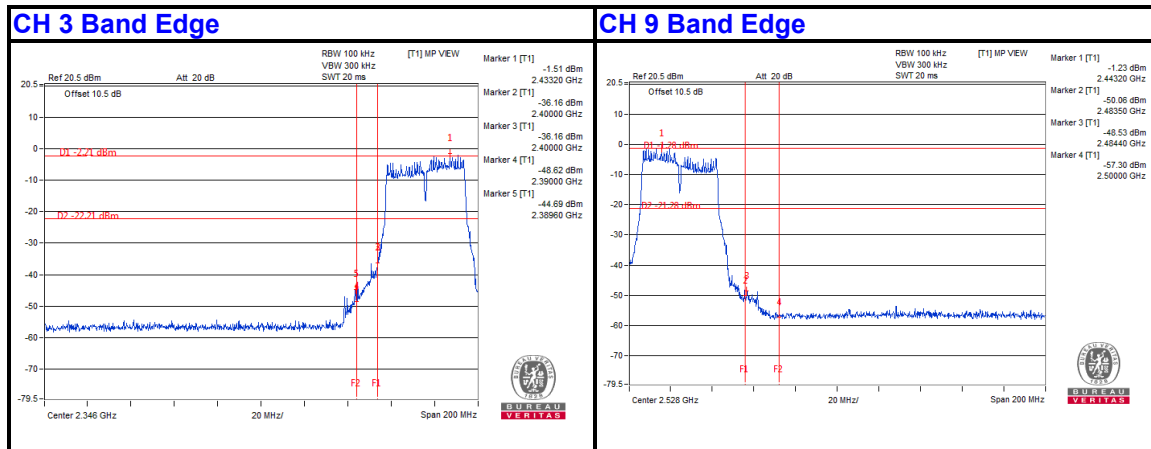
CH 9





BUREAU
VERITAS

Test Report No.: RF190522W005-7



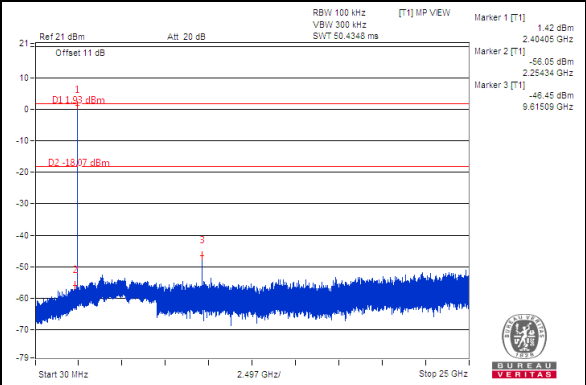
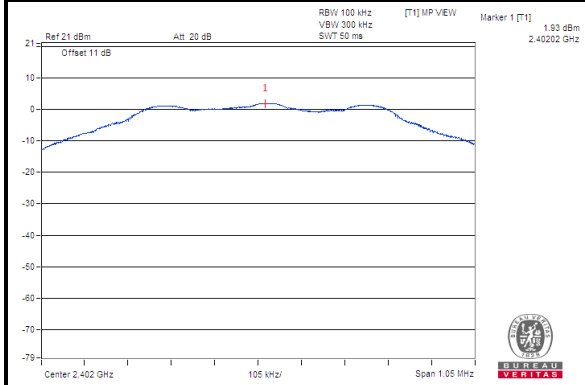


BUREAU
VERITAS

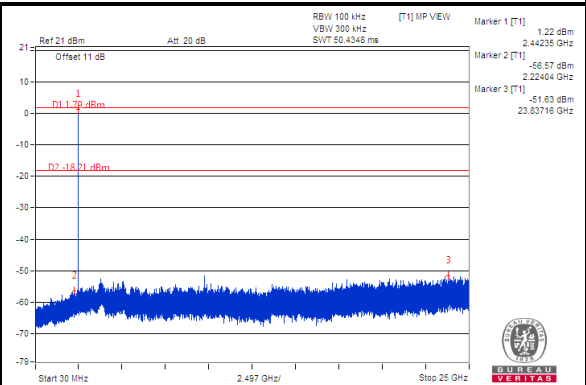
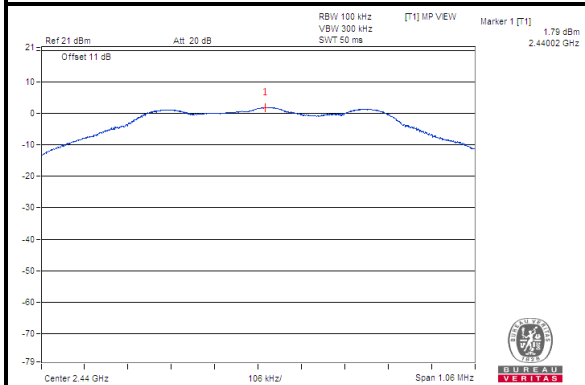
Test Report No.: RF190522W005-7

BT-LE_4.0

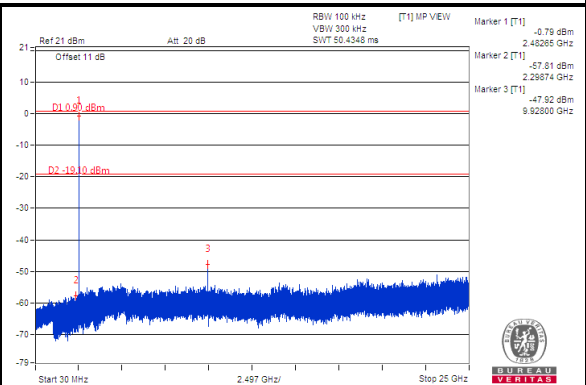
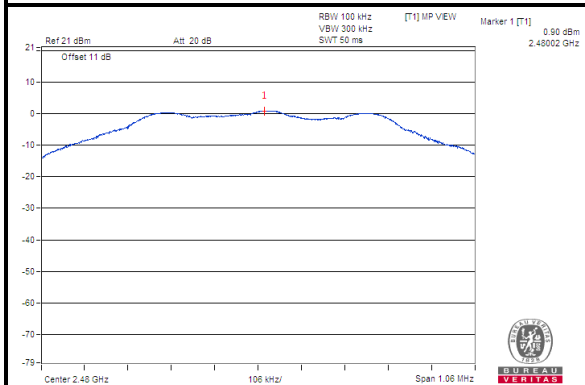
CH 0



CH 19



CH 39

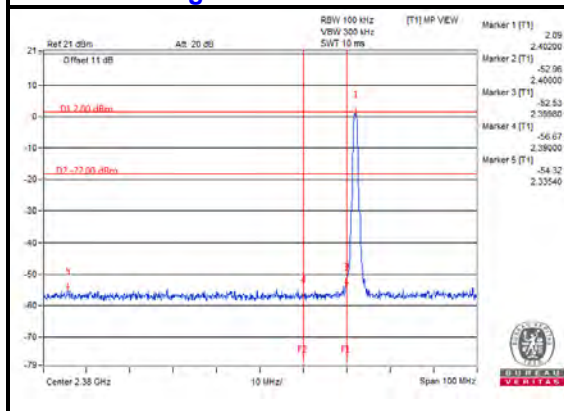




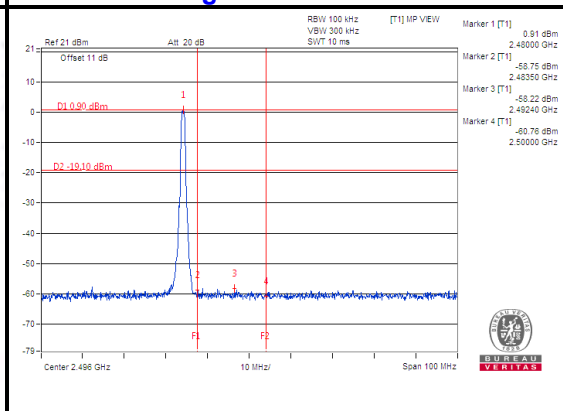
BUREAU
VERITAS

Test Report No.: RF190522W005-7

CH 0 Band Edge



CH 39 Band Edge



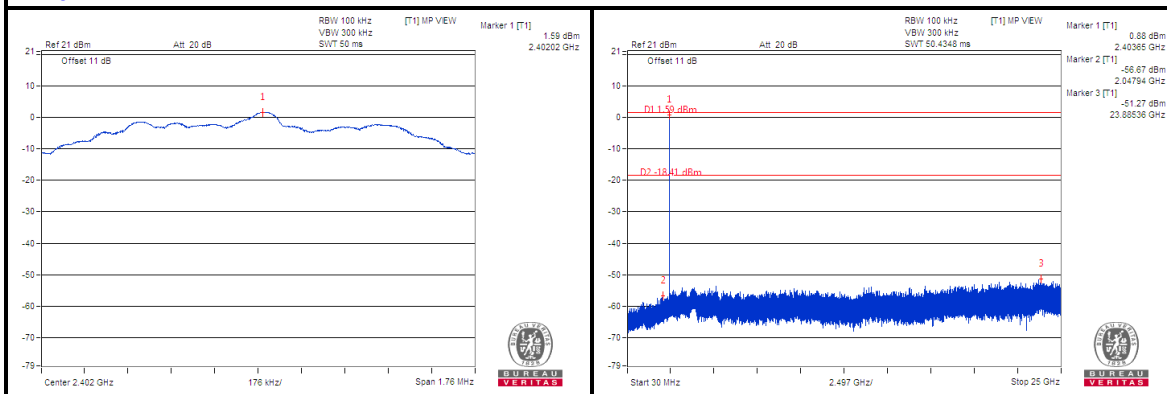


**BUREAU
VERITAS**

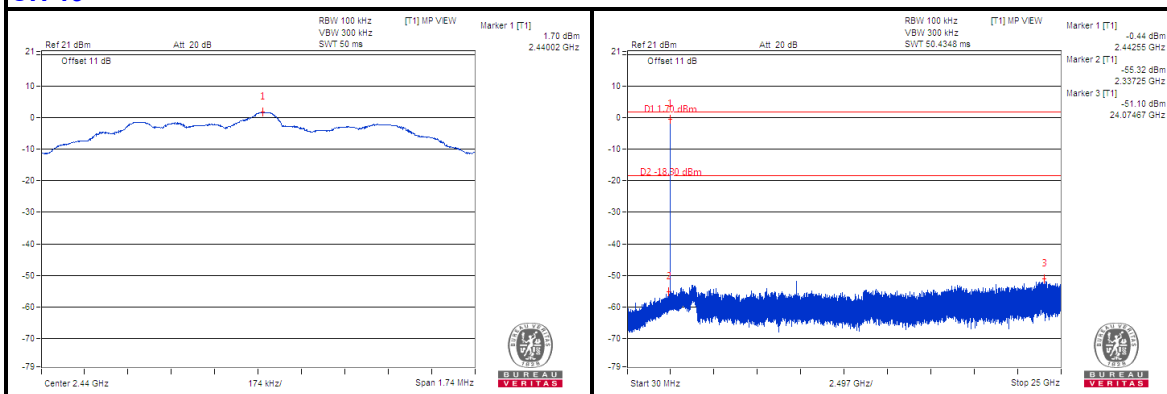
Test Report No.: RF190522W005-7

BT-LE_5.0

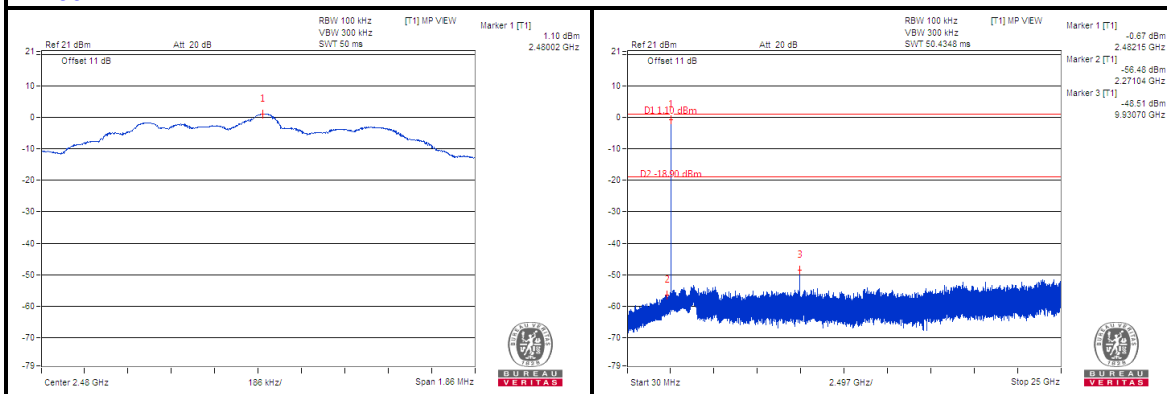
CH 0



CH 19



CH 39

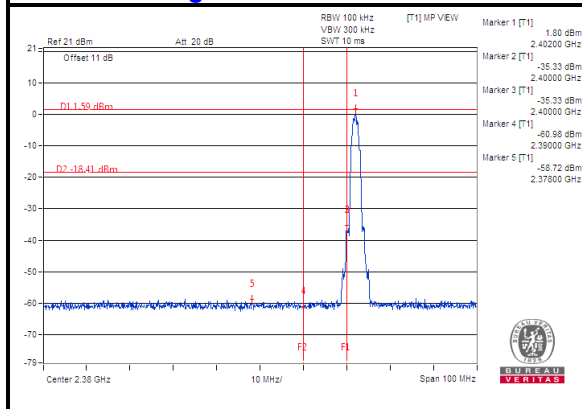




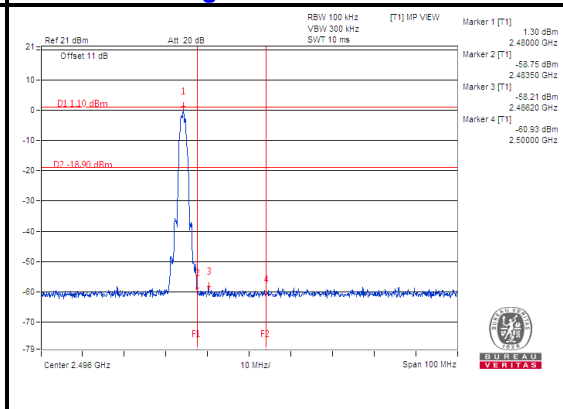
BUREAU
VERITAS

Test Report No.: RF190522W005-7

CH 0 Band Edge



CH 39 Band Edge





Test Report No.: RF190522W005-7

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



Test Report No.: RF190522W005-7

5 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---